DOES GREEN INFRASTRUCTURE PROMOTE EQUITABLE DEVELOPMENT? THE MEDIATING ROLE OF SOCIAL CAPITAL IN SHAPING IMPACTS

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SUMMARY

Planners, policymakers, and elected officials increasingly view investments in green infrastructure, parks and other green development as opportunities for spurring economic growth, increasing environmental quality, and providing social and recreational amenities in urban areas. However, research has indicated that these projects do not adequately address equity concerns, such as access for low-income and marginalized groups, housing affordability, and displacement of existing residents. Consequently, green infrastructure projects can lead to 'environmental gentrification.'

While several works have argued that social capital—the building of relationships, trust, and networks of stakeholders—has the potential to promote more equitable development, the conditions under which more equitable outcomes for green infrastructure projects might be supported and the role of social capital in addressing these concerns has not been adequately examined. This study seeks to clarify the mechanisms through which green infrastructure planning might advance the development of social capital and in turn how social capital influences the housing affordability, gentrification, and community benefits aspects of green infrastructure planning and policy development. The research examines these interrelationships in Atlanta and Washington, D.C., cities with a prominent focus on planning for green infrastructure, high levels of segregation by race and income, and distinct city-wide approaches to coping with gentrification.

In clarifying interactions between social capital and green infrastructure planning processes and outcomes, the research enhances our understanding of how social capital might support an increased focus on equity in green infrastructure planning. In particular,

the study finds that green infrastructure planning may reinforce social capital, which in turn shapes green infrastructure projects and planning processes with regard to addressing housing affordability and community benefits concerns. It further finds that social capital has served as a catalyst for advocacy and the development of organizations, policies, and programs focused on housing affordability and workforce development. Finally, state and city-level political contexts concerning the goals and tools for promoting housing affordability and community benefits shape the ability of municipal and neighborhood-level actors to address equity concerns associated with green development. These findings support several recommendations for policy and planning to promote more equitable development surrounding green infrastructure projects and planning processes.

CHAPTER 1. INTRODUCTION

1.1 Overview and Problem Statement

Planners and policymakers have promoted sustainability as an ideal in city and environmental planning in recent decades. The concept has generally been defined to include components of environmental quality, economic development, and social equity, commonly referred to as the 'triple bottom line.' The sustainability ideal has catalyzed a variety of planning efforts focused on simultaneously addressing these three components (Berke and Conroy, 2000, Portney, 2013). Yet, research has also noted that conflicts and tensions exist between these goals (Campbell, 1996, Marcuse, 1998), and that sustainability planning efforts have tended to focus primarily on the economic development and environmental quality components, while not providing as much attention to social equity concerns and the equity-related impacts of planning efforts (Godschalk, 2004, Gunder, 2006).

These concerns regarding the planning and implementation of sustainability are particularly notable within planning for green infrastructure, a concept referring to multifunctional green space networks that support ecological and social processes and that has been frequently promoted by planners and city leaders as a mechanism to achieve sustainability, livability, and justice goals in planning. Specifically, green infrastructure projects, from parks and greenways to stormwater management features, are often framed in terms of their ability to increase environmental quality, drive economic growth, and provide social and recreational amenities in urban areas. Indeed, green urban projects may provide a host of environmental, economic, and social benefits to cities, from public

health improvements, to stormwater management and climate change adaptation, to local economic development. Further, many of the outcomes supported by investments in green infrastructure are of particular importance in low-income, high-poverty neighborhoods, which often suffer from a lack of public investment and environmental justice concerns. The potential of green infrastructure to address environmental justice threats and provide access to environmental, economic, and social amenities makes it an important investment as cities seek to address environmental and equity concerns, particularly in low-income neighborhoods suffering from disinvestment.

In addition to utilizing green infrastructure to address environmental justice threats, actors ranging from local governments to nonprofit organizations have increasingly considered it a strategy to catalyze local economic development and neighborhood revitalization in communities experiencing disinvestment. Projects such as The High Line in New York City and the 6o6 in Chicago illustrate the use of green infrastructure projects to stimulate development and facilitate trends of movement back to city centers. The organizations and agencies leading these projects also frequently emphasize their importance for providing social benefits, including access to parks, nature, and recreation; neighborhood revitalization; and social and educational opportunities.

Yet, as has been a concern with other sustainability planning efforts, green infrastructure planning efforts may fail to prioritize or address social equity concerns. In particular, projects often create concerns surrounding gentrification and the displacement of low-income residents and communities of color. As the trend of utilizing green infrastructure to spur large-scale urban redevelopment has spread across the United States

and globally, residents have increasingly expressed concerns about the impacts of such projects on land and housing values and costs, with issues of gentrification and displacement often elevated as primary concerns. Research on these projects and planning efforts has described similar concerns as with sustainability planning efforts, noting that processes have focused primarily on the environmental, economic, and livability components of green infrastructure projects, while not prioritizing social equity aspects or impacts (Anguelovski, 2016, Zavestoski and Agyeman, 2014, Fisch, 2014). In particular, planning efforts may not consider social equity concerns such as access for low-income and marginalized groups, affordability, and displacement of existing residents.

The lack of prioritization of social equity in green infrastructure planning processes has a variety of implications, particularly in low-income communities in which these projects are often implemented to support neighborhood revitalization and address environmental justice threats. While governments and nonprofit organizations support the development of green infrastructure projects, these actors have typically left housing to market forces. Thus, improvements through green infrastructure may decrease housing affordability such that low-income residents can no longer afford to stay in the neighborhoods or move into them. Further, planning surrounding green projects may not address residents' other concerns and priorities for their neighborhoods, such as maintaining industry and working-class jobs and population, or providing economic opportunities for residents. For these reasons, residents in historically marginalized neighborhoods may increasingly view green development projects as locally unwanted land uses (LULUs) (Anguelovski, 2016). Researchers have given the name

environmental or ecological gentrification to this process of increasing housing values and displacement of current residents resulting from the implementation of green infrastructure and other green development.

Previous research has demonstrated the potential for green infrastructure to spur increases in housing values and rents and to create negative impacts for low-income communities with regard to cultural and political displacement. Yet, there remains interest in understanding how networks of stakeholders can shape green infrastructure projects and their planning processes in order to combat gentrification and displacement. To answer these questions, this dissertation analyzes green infrastructure planning processes from the perspective of social capital.

Social capital, or relationships, trust, and networks among stakeholders, is one factor which may be important in mitigating gentrification processes and supporting a focus on residents' other goals for their communities. In particular, diverse interactions between actors at different levels of governance, including government, advocacy, and grassroots actors, are necessary in order to address many of the challenges associated with environmental gentrification, such as housing affordability, gentrification, displacement of current residents, and community benefits. In this way, while green infrastructure may contribute to environmental gentrification, reduced affordability, or displacement, it may also support the building of social capital surrounding these issues, which has the potential to mitigate many of the negative impacts of environmental gentrification and support benefits and more equitable outcomes for current residents.

The dissertation examines green infrastructure processes and outcomes relating to social equity from the perspectives of environmental justice and environmental

gentrification. In defining environmental justice, I refer to Agyeman's (2005) definition, which he draws from the Commonwealth of Massachusetts (2002):

> "Environmental justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. Environmental justice is the equal protection and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits."

Definitions such as this one have developed to include both procedural and substantive aspects of justice. The literature on environmental gentrification emerged from the environmental justice literature and focuses on justice regarding issues of gentrification and displacement of residents in areas in which city agencies, nonprofit organizations, and community groups are planning and implementing environmental amenities, including green infrastructure. As noted previously, green infrastructure has the potential to support improvements in environmental quality, thus addressing some of the concerns of the environmental justice movement, but on the other hand, projects may create concerns of environmental gentrification. By focusing the research on these aspects of social equity in particular in examining green infrastructure planning processes and outcomes, the dissertation provides an important perspective on the potential and limitations for green infrastructure in addressing social equity concerns and fostering more equitable development.

To more fully understand the relationships between green infrastructure, social capital and equitable outcomes surrounding green infrastructure planning, I examine 1) the potential for green infrastructure to drive the development of social capital around issues of housing affordability and community benefits; 2) how social capital shapes green infrastructure projects and their planning efforts, as well advocacy, and the

development of policies and strategies to address housing affordability and community benefits concerns, and 3) how cities' political context shapes the role of social capital in addressing these concerns associated with green infrastructure.

The research concludes with several findings that form the basis for recommendations for policy and planning. First, the study points to the variety of environmental, economic, and social opportunities and threats posed by green infrastructure in low-income communities. The unique set of opportunities and threats for low-income communities and communities of color meant that residents often supported projects for their ability to address concerns such as chronic flooding and provide benefits such as access to parks and recreation, while at the same time viewing them as potential threats because of concerns of gentrification and displacement. While threats of gentrification and displacement of existing residents were most prominent in large-scale projects, they were brought up by residents in almost all green infrastructure planning processes examined as part of this study. Notably, different groups of actors focused at varying levels on the different opportunities and threats posed by green infrastructure in low-income communities, with park nonprofits and government agencies framing projects primarily in terms of benefits of park access and improvements in environmental quality, and residents and grassroots organizations more likely to emphasize the potential for additional benefits of workforce development and housing affordability, as well as threats of gentrification and displacement of current residents.

The study also demonstrates that green infrastructure planning processes and the opportunities and threats associated with projects have served as opportunities for the development of social capital, including the building of relationships, trust, behavioral

norms, and networks of communication, and intellectual capital, including knowledge sharing and mutual learning. The research provides insight into the mechanisms through which green infrastructure planning processes can support the development of social capital among residents and stakeholders. Projects in which interviewees discussed high levels of trust and strong relationships tended to have community engagement processes that were in-depth and flexible; to have higher levels of community leadership and control; and to devote higher levels of effort and resources to addressing goals identified by residents in planning processes. Projects which supported strong networks tended to be those which attracted and provided opportunities for involvement for stakeholders with a variety of interests; had requirements for project funding and expertise that necessitated partnerships with outside organizations, agencies, and philanthropic groups; were willing to cross boundaries of typical green infrastructure concerns and prioritize those outside concerns; and added goals outside of green infrastructure project implementation, such as housing and workforce development, which required skills and resources already well-developed in existing community groups and organizations.

Next, the research demonstrated that social capital developed in green infrastructure planning efforts has shaped green infrastructure projects and planning processes through shaping projects themselves, expanding green infrastructure planning processes to incorporate equitable development concerns, and supporting change at an organizational level. While community engagement frequently shaped projects to incorporate new elements or amenities desired by residents and stakeholders, the expansion of green infrastructure planning processes to incorporate concerns outside of project design and amenities was less common.

In addition to shaping green infrastructure projects directly, social capital developed around green infrastructure also drove the development of policies and advocacy focused on housing affordability, gentrification, and displacement. The opportunities and threats associated with green infrastructure catalyzed coalition building and advocacy, as groups formed or tailored their advocacy efforts in support of both green infrastructure implementation and the development of policies and strategies to address housing affordability and community benefits concerns. Green infrastructure also served as a focus for the development of policies and strategies focused on social equity concerns, with policies such as the BeltLine/ Westside Inclusionary Zoning Ordinance in Atlanta and the Green Jobs MOA in Washington, D.C. framing their housing affordability and community benefits policies and strategies around green infrastructure projects.

Finally, the findings of the study highlight the important role of city and state political context in shaping outcomes of green infrastructure projects. City and state political context around issues of housing affordability and community benefits shapes outcomes at a broader level than the individual project and is thus important for supporting more equitable outcomes at a larger scale. In addition to supporting equitable outcomes more broadly, the political context of the case cities provides an important foundation for the ability of neighborhood-level groups and project-level actors in developing strategies to address equitable development concerns.

1.2 Dissertation Outline

In order to understand these factors, it is first necessary to understand the relevant literature focused on sustainability and the conflicts it presents; green infrastructure and

its impacts, including the potential to address environmental justice threats and support environmental gentrification; and the potential for social capital to serve as a mediating factor to support projects in addressing equitable development concerns and to drive the development of policies and strategies to shape the outcomes of green infrastructure projects. I present a review of this relevant literature in Chapter 2.

Next, in order to provide a framework for the dissertation research design and questions, I develop a conceptual framework based on the literature review which shows the four primary elements of concern to the dissertation. These elements include investments in green infrastructure, the relationship between green infrastructure and environment and health qualities, the relationship between green infrastructure and land and housing markets, and the relationship between green infrastructure and social capital. I present the conceptual model in Chapter 3.

The dissertation's conceptual framework drives its research design and questions and case selection. I describe the research questions, hypotheses, multiple case study design, and case selection criteria in Chapter 4. The research questions and design suggest the use of a qualitative case study method, which I describe in Chapter 5.

Next, in order to understand the case cities and their appropriateness given the case selection criteria, I provide descriptions of the case cities of Atlanta, GA, and Washington, DC, including segregation by race and income, engagement in green infrastructure planning, housing market pressure surrounding new green infrastructure investments, and political context surrounding housing affordability, in Chapter 6.

In order to understand how green infrastructure supports the development of social capital, it is necessary to examine the variety of opportunities and threats posed by green projects in low income communities. Chapter 7 utilizes responses from interviews to detail the environmental, social and economic opportunities posed by green infrastructure, as well as threats posed by direct and indirect, cultural, neighborhood resource, and political forms of displacement.

The opportunities and threats posed by green infrastructure supported the development of social capital in several ways, and this social capital in turn shaped green infrastructure projects and their planning processes. Chapter 8 details the ways in which social capital developed within and outside of green infrastructure planning efforts, including how green infrastructure planning supported the building of relationships and trust, the formation of networks and connections, and the development of intellectual capital. Chapter 9 examines the role of social capital in shaping green infrastructure projects and planning efforts, including the incorporation of social equity concerns into projects themselves, the expansion of green infrastructure planning processes, and organizational change. It also analyzes the limitations of social capital in shaping green infrastructure projects and planning processes.

In addition to shaping green infrastructure projects and their planning processes, social capital has supported advocacy and the development of policies and strategies focused on addressing housing affordability and community benefits concerns. Chapter 10 examines how green infrastructure has served as a driver of coalition building and advocacy and of the development of policies and strategies to address housing affordability and community benefits concerns.

Cities' political context surrounding housing affordability constitutes an important contextual factor that shapes the role and potential of social capital to support more equitable development around green infrastructure projects. The case cities of Atlanta, GA and Washington, DC, were selected to provide variation in political context with regard existing policies and strategies in support of housing affordability, support for the development of new policies and strategies, and the level of local autonomy to implement strategies in support of housing affordability. Chapter 11 examines how the political context of the case cities shapes the role of social capital in tackling housing affordability challenges.

The findings of the dissertation suggest several recommendations for policy and planning and directions for future research. In Chapter 12, I present a review of the dissertation questions and approach, the study's conclusions, recommendations for policy and planning, and recommendations for future research.

CHAPTER 2. LITERATURE REVIEW

Planners, policymakers, and elected officials increasingly view green infrastructure as a mechanism for supporting environmental, economic, and quality of life goals in urban areas. However, research has also described the potential for social equity concerns surrounding new green amenities, including gentrification, increasing rents and property values, and displacement of neighborhood residents. Social capital, or networks of actors and associated trust and norms in relationships between actors (Putnam, 1995), has been discussed in the literature as a potential mitigating factor for gentrification concerns, as well as a mechanism for supporting more equitable development surrounding green projects.

However, gaps in the current literature exist with regard to how green infrastructure might serve as a catalyst for social capital development and the mechanisms through which social capital might shape green infrastructure projects and the policies surrounding them to mitigate gentrification impacts and support more equitable development. The dissertation examines how green infrastructure shapes social capital and collaboration; how social capital and collaboration shape green infrastructure with regard to form, function, context, and focus on social equity concerns; and how social capital and collaboration contribute to the institutionalization of policies and processes surrounding issues of affordability, gentrification, displacement, and community benefits.

This literature review provides a foundation for the research design, concluding with the development of a conceptual framework that displays the tensions between green

infrastructure, social capital and collaborative processes, and their relationships with environmental and health qualities, land and housing markets, and, ultimately, impacts on low-income communities.

I first examine the concept of sustainability, tensions between its major goals, and its relationship to green infrastructure. Next, I discuss the literature surrounding green infrastructure definitions and typologies and detail the potential of green infrastructure to both address environmental justice concerns and increase the potential for environmental gentrification. I then discuss the social capital literature and the relationship of social capital and collaborative processes to outcomes such as the development of intellectual and political capital. Finally, I examine the literature surrounding the impact of green infrastructure on social capital and the impact of social capital on green infrastructure planning. I conclude with a discussion of the research gaps and implications for the project's research design.

2.1 Sustainability and its Conflicts

Emerging from limits to growth debates in the 1970s, the term sustainability encompasses the ideals of environmental quality, economic development, and social equity. Literature focusing on sustainability has addressed the tensions between these goals, seeking to find a balance between them. In particular, a focus on social equity, beginning with the Brundtland Commission's publication of 'Our Common Future' in 1987, has led planners and policymakers to consider tensions between goals for environmental quality and those for addressing issues such as poverty and inequitable distribution of resources, costs, and benefits. The commission's definition of sustainable

development, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987), has become the most widely used definition of sustainability. The report also introduces the concepts of intergenerational and *intra*generational equity, or equity between different generations and equity within a generation, respectively. It argues that, in addition to economic development and environmental quality, both types of equity are necessary for the achievement of sustainability goals.

Agyeman, Bullard, and Evans (2003) further this definition by specifically including concepts of justice and equity in their conception of sustainability as “the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems (p. 78). The authors argue that social injustice is a cause of the symptoms of environmental and economic instability, and that sustainability must be more than a strictly environmental concern. For the authors, “A truly sustainable society is one where wider questions of social needs and welfare, and economic opportunity, are integrally connected to environmental concerns” (Agyeman, Bullard, and Evans, 2003, p. 2).

Planning scholars and environmental justice advocates began to consider tensions and contradictions between the different goals of sustainability by the 1990s. Campbell (1996) emphasizes the potential conflicts between the goals of economic growth, environmental protection, and social justice, identifying these conflicts as “the property conflict” (between economic growth and social justice), “the resource conflict” (between economic growth and environmental protection), and “the development conflict” (between environmental protection and social justice) (see Figure 1). In particular,

Campbell (1996) focuses on the development conflict as the "most elusive" of the three and describes how the conflict might play out at several scales (p. 299). Campbell's work incited discussion regarding the challenges involved in achieving the different goals of sustainability and furthered the argument that environmental and equity goals are not necessarily in accord.

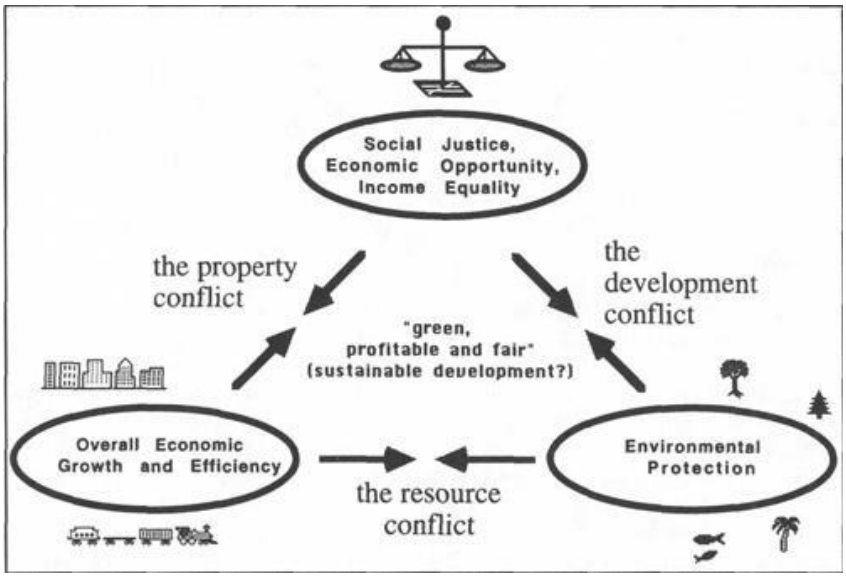


Figure 1: Sustainability and its conflicts (Campbell, 1996)

Similarly, Dobson (2003) examines the tensions between environmental sustainability and environmental justice, noting that while both movements are concerned with the environment, they have differing objectives. The environmental sustainability movement has been concerned with preservation of the natural environment, while the environmental justice movement "aims to divide up the worked environment (particularly the bad bits of it) more fairly" (Dobson, 2002, p. 93). In this way, "Sustainability is about preservation and/or conservation; justice is about distribution" (Dobson, 2002, p. 93), and the justice and sustainability movements are divergent.

Godschalk (2004) expanded on the concept of sustainability and its tensions by adding the component of livability to the sustainability triad, creating a "sustainability/livability prism" and adding new potential tensions including "the growth management conflict" (between livability and economic development), "the green cities conflict" (between livability and ecology), and "the gentrification conflict" (between livability and equity) (p. 8) (see Figure 2). He argues that while the sustainability movement has focused mostly on the conflict between economy and ecology, recent planning movements have focused on the livability-economy (New Urbanism) and livability-ecology (Smart Growth) conflicts. The sustainability movement has treated equity as a secondary value to economy and ecology, and the New Urbanist and Smart Growth movements have neglected the livability-equity or gentrification conflict. Godschalk (2004) concludes that planning must encompass a more comprehensive set of concerns, and that the sustainability-livability prism may be useful in locating gaps in the planning ecology of local areas.

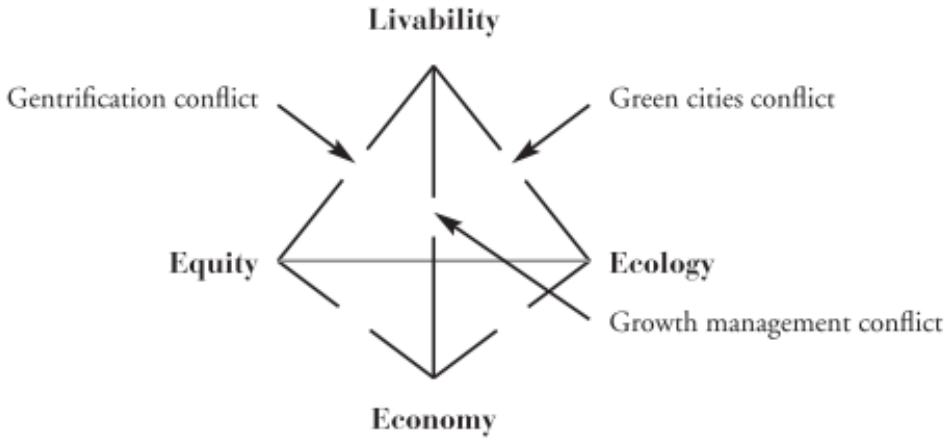


Figure 2: Sustainability-livability prism (Godschalk, 2004)

The frameworks by Campbell (1996) and Godschalk (2004) are useful in demonstrating the challenges cities face in practice with regard to implementing the full range of sustainability and livability principles. Indeed, Berke and Conroy (2000) found no significant differences between plans that incorporated sustainability principles and those that did not with regard to policies and strategies included in the plans. Jepson (2004) further notes that most communities adopt piecemeal policies rather than focusing on a broader strategy including all three components of sustainability. Green urban development, in particular, has often prioritized environmental, economic, and livability goals over equity concerns such as housing affordability, gentrification and displacement, and community empowerment and control (Agyeman, 2013, Anguelovski, 2015). The tensions between the environmental, economic, livability, and social equity goals of green infrastructure planning are central to this dissertation.

2.2 Green Infrastructure

2.2.1 Green Infrastructure Definitions and Typologies

Green infrastructure has been increasingly discussed as an important component of sustainability in urban planning and land conservation. It is a concept that may refer to a wide array of natural features, engineered structures, or managed networks of green space and their associated ecosystem services. A variety of definitions exist, depending on sector, context, and inclusion in theory versus policy discussions. The concept remains in dispute, divided between environmental theory and socioeconomic policy (Wright, 2011).

In a broad sense, green infrastructure refers to "an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides an array of benefits to people and wildlife" (Benedict and McMahon, 2006, p. 1). In line with this perspective, green infrastructure is viewed as a holistic, strategic framework for urban development that links natural systems (Kambites and Owen, 2006), as opposed to isolated green space conservation efforts (Walmsley, 2005, Beatley, 2000). Overlapping principles of green infrastructure include networks and connectivity, multifunctionality, and increased green space (Wright, 2011, Mell, 2010, Figure 3).

Source	Definition	
(Ahern 2007, p. 267)	"Green infrastructure is an emerging planning and design concept that is principally structured by a hybrid hydrological/drainage *network*, complementing and linking relict *green* areas with built infrastructure that provides ecological functions".	Green infrastructure theory
(Benedict and McMahon 2002, p. 2)	"Our nation's natural life support system – an *interconnected network* of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks and other conservation lands; working farms, ranches and forests; and wilderness and other spaces that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to the health and quality of life of America's communities and people".	
(DCLG 2008, p. 5, 2010, p. 25)	"'Green infrastructure' is a *network* of *multifunctional green* space, both new and existing, both rural and urban, which supports the natural and ecological processes and is integral to the health and quality of life of sustainable communities".	Green infrastructure policy
(Natural England 2009, p. 7)	"Green Infrastructure is a strategically planned and delivered *network* comprising the broadest range of high quality *green* spaces and other environmental features"	
(Kambites and Owen 2006, p. 484)	"Green infrastructure is taken . . . to encompass *connected networks* of *multifunctional*, predominantly unbuilt, space that supports both ecological and social activities and processes".	Linking theory and policy

Figure 3: Definitions of "green infrastructure" (Wright, 2011)

Descriptions of green infrastructure planning may also focus on planning processes and the inclusion of a range of stakeholder groups and interests (Kambites and Owen, 2006, Benedict and McMahon, 2006, Young, 2011). As Benedict and McMahon (2006) describe, in addition to physical networks, green infrastructure describes "a process that promotes a systematic and strategic approach to land conservation at the national, state, regional, and local scales, encouraging land-use planning and practices that are good for nature and for people" (p. 3).

Green infrastructure projects can be differentiated based on their form, function, context, and the ecological, economic, and social elements of these aspects (Mell, 2010, Ahern, 1995), as well as the planning processes and models employed (Maruani and Amit-Cohen, 2007, Ahern, 1995). At a broad level, Mell (2010) proposes a typology which considers ecological, economic, and social aspects of green infrastructure form, function, and context. This typology allows for the examination of a variety of outcomes related to green infrastructure as it varies in form, function, and context (Figure 4).

Typology classification	Element or function
FORM	*Ecological* (physical space, connectivity, elements) *Economic* (costs of a space, design) *Social and cultural norms* (users of a space, aesthetics of a space, motivations)
FUNCTION	*Ecological* (biodiversity, conservation) *Economic* (industry, business, regeneration) *Social* (education, recreation, health)
CONTEXT	*Ecological* (biodiversity, supporting networks, ecological mobility) *Economic* (costs of a space, economic development, sustainability) *Social and cultural norms* (location, facilitations, motivations, perceptions)

Figure 4: Green infrastructure typology classifications (Mell, 2010)

Other proposed typologies also focus on the form and function of green infrastructure investments. Mell (2013) provides a typology developed from the academic and practitioner literatures that divides green infrastructure into categories of visually and ecologically green resources; infrastructure characterized as sustainable, such as cycle paths; and visually and sustainable green infrastructure, such as green walls and green roofs (Figure 5).

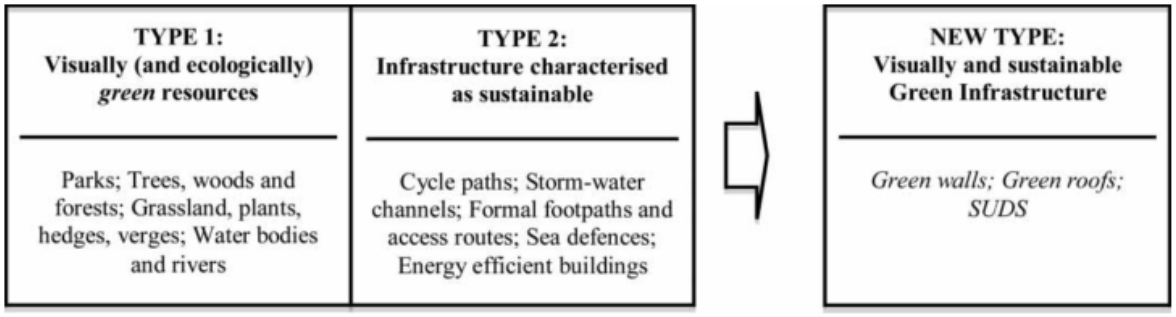


Figure 5: Green infrastructure characteristic typology (Mell, 2013)

Similarly, Davies et al (2006) propose a grey-green continuum in which infrastructure may be described simultaneously as green and grey (see Figure 6). For example, paved cycle routes may be green or sustainable in function, and grey in form (Mell, 2010).

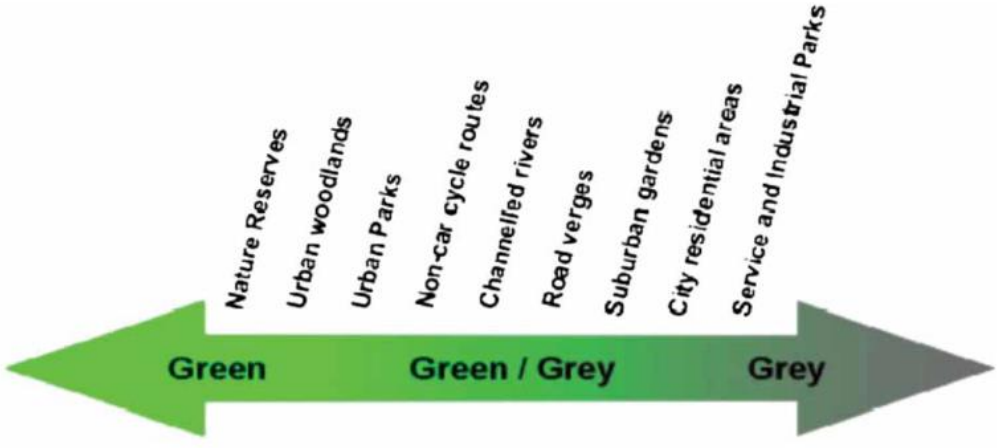


Figure 6: Grey-green continuum (Davies, 2006, in Mell, 2013)

In these typologies, the form of green infrastructure projects is a primary way of distinguishing between green infrastructure projects. It includes factors such as a project's physical space, design, and elements included (Mell, 2010), and whether projects are visually green or grey (Mell, 2013, Davies, 2006). Form may also include the spatial configuration of green infrastructure, such as the inclusion of landscape patches (parks, wetlands, gardens, etc.) and corridors (rivers, greenways, etc.) (Ahern, 2007). Finally, the scale of green infrastructure projects, which may vary from local to regional levels is another aspect of form (Ahern, 1995, Mell, 2010).

Function is another mechanism for categorizing green infrastructure. Green infrastructure may serve a variety of ecological, economic, and social roles. Environmental functions may include managing stormwater, improving air and water quality (Hoyer, Dickhaut, Kronawitter, and Weber, 2011), adapting to climate change impacts (Gill, Handley, Ennos, and Pauleit, 2007, Stone, 2012, Norton et al, 2015), supporting biodiversity (Tzoulas et al., 2007, Forman, 2008), or alternative transportation

(Conine, Xiang, Young, and Whitley, 2004). Economic functions may include local economic development (Daniels, 2008) or food production opportunities. Social functions may include providing social and recreational opportunities, experience with nature, educational opportunities, and cultural experiences (Ahern, 2007). These functions are discussed further in the next section.

Context is another defining factor of green infrastructure. It may include ecological factors such as a project's surrounding landscape (Ahern, 1995) or the relationship of a project to other green infrastructure in a network (e.g., connections among patches, relatively homogenous nonlinear areas that differ from their contexts, and corridors, linear areas that differ from their surrounding contexts) (Forman, 2008, Dramstad, Olson, and Forman, 1996)). Context may also include factors such as economic development opportunities (e.g., Daniels, 2008) and the motivations and perceptions surrounding green infrastructure development (Mell, 2010).

Green spaces may also be categorized by planning model or strategy (Maruani and Amit-Cohen, 2007, Ahern, 1995). Ahern (2007) classifies different types of green infrastructure planning strategies according to their use of preventative, offensive, defensive, and opportunistic strategies (see Figure 7). For example, large landscape patches such as nature preserves, which serve to protect intact landscape functions, are classified as protective, while greenways and urban green infrastructure, which can be managed to provide specific functions, are classified as opportunistic.

Protective	Defensive
Taking preventative actions to preserve well functioning, intact landscape elements before they are threatened by change or development: • World Heritage Areas • National Parks • "Big" patches of native vegetation • Nature preserves	Implementing actions to defend landscape elements that are suffering from development pressure: • Regional, local parks • Buffer zones • Environmental impact mitigation • Corridors that are pressuredfrom adjacent land use(s)
Offensive Taking remedial or restorative actions to reintroduce abiotic, biotic or cultural functions where they do not currently exist: • Ecological restoration • Brownfields • Daylighted streams • Bioremediation	Opportunistic Recognizing the potential for non-contributing landscape elements to be managed or structured differently to provide specific functions. • Many greenways • Most urban/green infrastructure • Transportation and utility infrastructure

Figure 7: Typology of green infrastructure planning strategies (Ahern, 2007, Ahern, 1995)

Maruani and Amit-Cohen (2007) describe other planning models including an opportunistic model, in which open space is allocated when opportunities arise; space standards for quantitatively allocating park space; park systems; the Garden City comprehensive approach, in which open spaces are viewed as an integral part of development; shape-related models, in which open spaces are defined by their shape; landscape models (e.g., preservation of rural/ agricultural landscapes); ecological determinism, in which planning is determined by land characteristics; protected landscapes, in which unique nature or heritage is preserved at a national scale; and biosphere reserves, which are comprised of concentric zones of differing levels of conservation (Figure 8). The models support different guiding principles and focuses, as well as a variety of scales, sizes, and levels of variety, interrelations, and intervention in green space development.

Model type		Main guiding principle	Scale	Size	Proximity	Variety	Interrelations	Intervention	Main focus
Opportunistic		Random application	Mainly local	Small to large	Usually high	High	None	High	Recreation
Space standards		Accommodating population size	Local	Small to medium	High	High	High	High	Recreation
Park systems		Interrelating between spaces physically or hierarchically	Local	Small to large	High	High	High	High	Recreation
Garden city		Comprehensive planning integrating development and open space	Local	Small to large	High	High	High	Medium to high	Recreation
Shape- related	Greenbelt	Open space encircling development	Local	Large	Medium	Low to medium	Low	Low to medium	Variable
	Green heart	Open space encircled by development	Metropolitan, regional	Large	Medium	Low to medium	Low	Low to medium	Variable
	Green fingers	Radial strips of open space penetrating development	Local and metropolitan	Medium to large	Medium to high	Low to medium	Medium	Low to medium	Variable
	Greenways	Open space along linear elements (natural or man-made)	Local to regional	Medium to large	Medium to high	Low to medium	Low to high	Low to medium	Variable
Landscape - related	Landscape features	Emphasizing landscape features through open space	Local to regional	Large	Low to medium	Low to medium	Low to medium	Low	Conservation
	Cultural landscapes	Conservation of agricultural landscapes in developing regions	Metropolitan and regional	Large	Low to medium	Low	Low	Medium	Conservation
Ecological determinism		Conservation of vital or high-quality natural resources	Mainly metropolitan and regional	Medium to large	Low to medium	Low to medium	Low to medium	Low to medium	Conservation
Protected landscapes		Conservation of unique or rare landscapes and habitats	Mainly national	Large	Low	Very low	Low	Very low	Conservation
Biosphere reserves		Integration between conservation of natural resources, agriculture and low-impact development	Regional	Large	Low to medium	Low to medium	Medium to high	Low to medium	Conservation

Figure 8: Green infrastructure planning models (Maruani and Amit-Cohen, 2007)

The framework below combines the major aspects of these typologies for green infrastructure (see Figure 9). Major types of green infrastructure may be developed using this typology, including greenways and recreational trails, nature preserves and natural areas, urban parks, and stormwater management features. These types of green infrastructure vary in their function, form, and context. For example, trails and greenways generally serve recreational and public health purposes in addition to environmental or economic development functions, are considered green-grey corridors, and could be used to connect other green infrastructure features or patches. In contrast, watershed restoration projects may serve functions more focused on restoration, stormwater management, and public health, are visually green, and may consist of patches and corridors in a larger watershed.

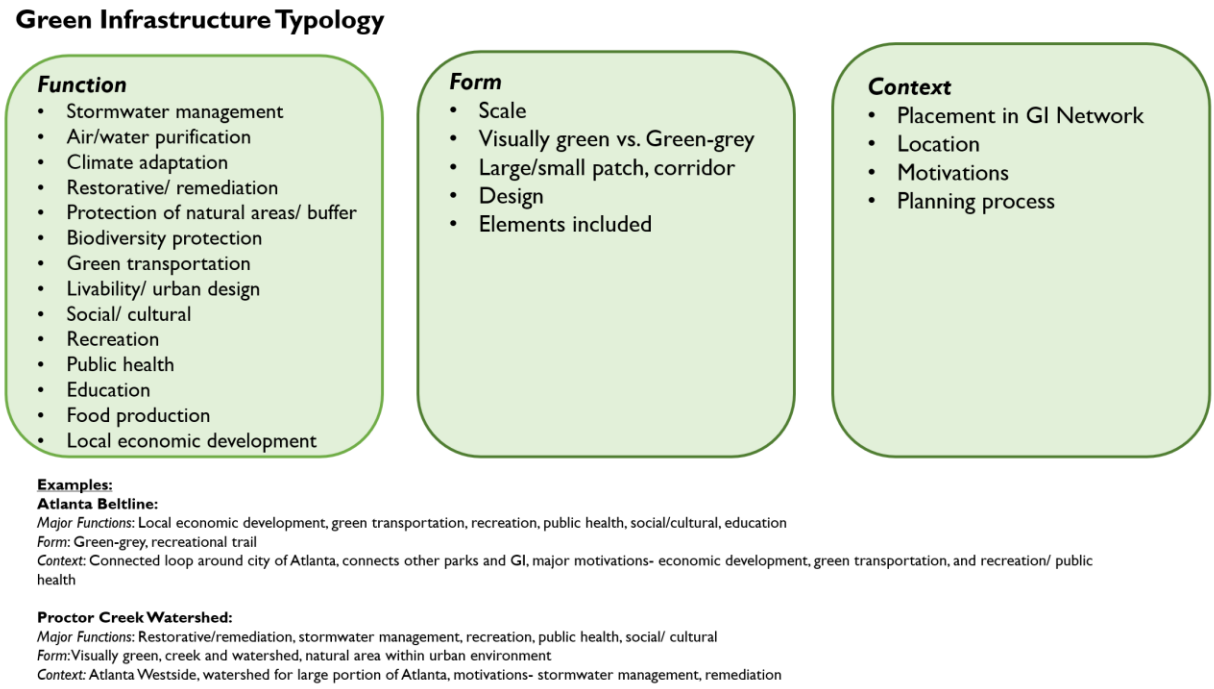


Figure 9: Proposed green infrastructure typology

2.2.2 Green Infrastructure Impacts

Previous research has proposed a multitude of impacts of green infrastructure investment, ranging from its ability to address a variety of environmental justice concerns to the potential for environmental gentrification. The following sections discuss the potential environmental justice and environmental gentrification impacts of green infrastructure.

2.2.2.1 Environmental justice.

Green infrastructure has the potential to address many of the concerns described by the environmental justice movement. This section first describes the evolution of the environmental justice movement and then discusses potential roles for green infrastructure in addressing the movement's evolving set of issues.

The definition of environmental justice has been debated as the field has developed. Early environmental justice literature (Chavis, 1987) used the term "environmental racism" to describe the unequal distribution of environmental goods and bads for racial minorities. More recently, the term "environmental inequality" has been used to encompass other factors affecting disproportionate impacts, including class, gender, and immigration status (Sze and London, 2008). Agyeman (2005) uses a definition of environmental justice developed by the Commonwealth of Massachusetts (2002) which states that

> "Environmental justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. Environmental justice is the equal protection and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits."

Definitions like this have developed to include both procedural and substantive aspects of justice. As Schlosberg (2013) argues,

> "what movements have meant by the 'justice' of environmental justice encompasses not only equity, recognition, and participation, but, more broadly, the basic needs and functioning of individuals and communities. A capabilities approach to justice, which encompasses a range of basic needs, social recognition, and economic and political rights, has offered a broad framework with which we can understand the array of demands of environmental justice movements" (p. 40)

The early environmental justice perspective combined a focus on environmental conditions as they are experienced in the everyday lives of communities with traditional environmental concerns (Agyeman, 2005, Schlosberg, 2013, Sze and London, 2008, Anguelovski, 2013). In particular, it focused on the distribution of environmental risk with regard to race and class for environmental "bads," such as toxic waste. The literature to date has demonstrated that race and class are both associated with proximity to hazards

as well as timing and extent of remediation action, although disagreement exists with regard to the importance of each factor in driving these inequalities (Brulle and Pellow, 2006). Early environmental justice advocates often fought against the siting of unwanted land uses in their neighborhoods for reasons including health risks, quality of life, and community image, among others (Schively, 2007).

The movement has expanded to address concerns with the distribution of environmental "goods," such as parks and housing, and the impacts of this distribution (Schlosberg, 2013, Anguelovski, 2013). By the 1990s, environmental justice literature began to take a more comprehensive perspective of environmental inequality, focusing on topics including transportation (Bullard, 2004), land use, housing, and community empowerment (Anguelovski, 2015, Schlosberg, 2013). Proponents focused increasingly on access to amenities, including parks, recreation opportunities, and urban vegetation in addition to avoiding environmental 'bads' and participation in decision-making processes (Anguelovski, 2013).

2.2.2.2 Green Infrastructure as Addressing Environmental Justice Concerns.

Planners and city leaders increasingly frame urban greening projects in terms of their ability to address concerns surrounding environmental justice, including a host of environmental, economic, and social issues (Rouse and Bunster-Ossa, 2013). These include mitigating environmental justice threats, or 'bads,' such as flooding or poor air or water quality, as well as supporting access to environmental amenities, or 'goods,' such as recreation or transportation opportunities.

Environmental benefits of green infrastructure projects may be most obvious and include aspects such as stormwater management, air and water quality (Hoyer, Dickhaut, Kronawitter, and Weber, 2011), adaptation to climate change impacts (Gill, Handley, Ennos, and Pauleit, 2007, Stone, 2012, Norton et al, 2015), and increased biodiversity (Tzoulas et al., 2007, Forman, 2008,), among others (Beatley, 2011). Green infrastructure can serve to manage stormwater and adapt to flood risk (Hoyer, Dikhaut, Kronawitter, and Weber, 2011, Lennon, Scott, and O'Neil, 2014), as well as improve air and water quality by removing harmful pollutants (Rouse and Bunster-Ossa, 2013). Green infrastructure interventions such as street trees, gardens, and parks present an opportunity to moderate and adapt to climate change impacts (Gill, Handley, Ennos, and Pauleit, 2007, Norton et al, 2015). Further, green infrastructure supports biodiversity through maintaining habitat systems and supporting ecological networks, thus helping to alleviate habitat fragmentation (Dramstad, Olson, and Forman, 1996, Forman, 2008, Tzoulas et al, 2007). Ahern (2007) argues that green infrastructure serves abiotic, biotic, and cultural functions (see Figure 10). In this diagram, the abiotic and biotic functions provide an overview of the environmental services green infrastructure may serve to provide, while the cultural functions are more related to the social dimensions of green infrastructure.

Abiotic	Biotic	Cultural
Surface:groundwater interactions	Habitat for generalist species	Direct experience of natural ecosystems
Soil development process	Habitat for specialist species	Physical recreation
Maintenance of hydrological regime(s)	Species movement routes and corridors	Experience and interpretation of cultural history
Accommodation of disturbance regime(s)	Maintenance of disturbance and successional regimes	Provide a sense of solitude and inspiration
Buffering of nutrient cycling	Biomass production	Opportunities for healthy social interactions
Sequestration of carbon and (greenhouse gasses)	Provision of genetic reserves	Stimulus of artistic/abstract expression(s)
Modification and buffering of climatic extremes	Support of flora:fauna interactions	Environmental education

This figure articulates what a green urban infrastructure can explicitly do to contribute to sustainability.

Figure 10: Abiotic, biotic and cultural functions of green urban infrastructure (Ahern, 2007)

Green infrastructure projects may also have economic impacts on cities through stimulating economic activity (Daniels, 2008), increasing property values (Bolitzer and Netusil, 2000, Acharya and Bennett, 2001, Nicholls and Crompton, 2005), providing job and business opportunities, and creating costs savings relative to gray infrastructure expenses resulting from aspects such as reduced energy use and maintenance costs (Rouse and Bunster-Ossa, 2013). Cities investing in green infrastructure may also draw talent from outside areas because of increases in quality of life resulting in part from green infrastructure investments (Daniels, 2008). Additional economic impacts of green infrastructure include costs avoided by reductions in commuting by car (for greenways and trails), the potential to reduce cooling costs with more moderate microclimates (Jo and McPherson, 2001), health impacts, and improved traffic safety (Vandermuellen et al,

2011). Costs may include project investment costs, indirect regional burdens such as increases in taxes, project maintenance costs, and costs of land use change (Vandermuellen et al, 2011).

In addition to environmental and economic aspects, social concerns are a major component in planning for green infrastructure, and may range widely, including overlap with many of the environmental and economic aspects noted above. Ahern (2007) notes several social impacts of green infrastructure, including experience of natural ecosystems, social and recreation opportunities, experience and interpretation of cultural history, opportunities for artistic expression, and environmental education (see Figure 10). Further, the environmental benefits of improved stormwater management, air and water quality, climate change adaptation and increased biodiversity, among others, have social impacts as well as environmental ones. These may include aspects such as improvements in public health and quality of life resulting from reduced flooding or improved air and water quality (Hoyer, Dickhaut, Kronawitter, and Weber, 2011), access to parks and recreational opportunities, and increased wellbeing and mental health associated with access to nature (Beatley, 2011, Wolch, Byrne, and Newell, 2014, Chawla, 2015, Cheisura, 2004). Further, green infrastructure may provide opportunities for food production (Agyeman, 2013) and local economic development, which have social as well as economic impacts (Rouse and Bunster-Ossa, 2013, Ahern, 2007).

Many of the potential benefits of green infrastructure investment may be particularly important for low-income, high-poverty neighborhoods. As these areas are often low priorities for public investments in amenities and infrastructure and have less market power to attract firms and jobs (Curley, 2005), they often have increased need for

environmental, economic, and social investment and the benefits discussed previously. Further, a lack of public and private investment in high-poverty neighborhoods often leads to negative outcomes for residents' health and wellbeing, from reduced access to recreation, amenities, and healthy food, to increased risks of crime and exposure to toxic pollutants in the environment (Wen, Browning, and Cagney, 2003). As has been noted for decades by activists working in the environmental justice movement, low-income neighborhoods and those with high proportions of residents of color are generally more likely to be selected as locations for toxics and other undesirable land uses, which have been fought against because of their associated health risks, and reductions in quality of life and community image (Schively, 2007). Uneven access to benefits associated with green urban development, such as urban parks, trails, and green infrastructure, may also exacerbate environmental health disparities (Jennings, Gaither, and Gragg, 2012). In the context of low-income neighborhoods, planners and residents may view green infrastructure as a viable investment in working toward environmental, economic, and social sustainability goals.

2.2.2.3 Green Infrastructure and Environmental Gentrification.

As marginalized neighborhoods have benefitted from cleanups and environmental amenities, recent literature has also focused on issues of justice with regard to the location of these green or other 'beneficial' amenities in historically disadvantaged neighborhoods. In particular, green infrastructure may contribute to gentrification processes, which have been defined to include reinvestment of capital; social change with higher-income groups moving into neighborhoods; landscape change; and direct or indirect displacement of low-income groups (Davidson and Lees, 2005, Lees, Wyly, and

Slater, 2010). To specify gentrification concerns associated with 'green' investments in particular, Dooling (2008) developed the term 'environmental gentrification,' defined as the "displacement of vulnerable human inhabitants resulting in the implementation of an environmental agenda driven by an environmental ethic" (p. 41).

While public investment in green infrastructure has the potential to provide a wide range of benefits in urban areas experiencing disinvestment and high rates of poverty, residents of these areas often voice concerns regarding equity issues of gentrification, displacement, or reduced affordability in their neighborhoods (Dooling, 2008, Checker, 2011, Agyeman, 2013, Zavestoski and Agyeman, 2014). Concerns often center around maintaining affordability and preventing displacement in low-income communities and communities of color. For Checker (2011), environmental gentrification "describes the convergence of urban redevelopment, ecologically-minded initiatives and environmental justice activism in an era of advanced capitalism" (p. 212). The provision or restoration of environmental amenities serves to attract more affluent, predominantly white, residents, and the "simultaneous greening and whitening" of neighborhoods surrounding the amenities may result (Checker, 2011, p. 216). In this way, green investments such as bicycle lanes and other 'Complete Streets' accessibility improvements, or healthy foods supermarkets (Anguelovski, 2016) attracting a new "eco-conscious class" are perceived by planners as politically neutral, while their end result is unjust and unsustainable (Zavestoski and Agyeman, 2014).

Issues of gentrification following the development of green infrastructure and amenities often create challenges for low-income residents, as affordability and remaining in the neighborhood often seem to conflict with bringing new environmental

amenities to the neighborhood (Checker, 2011). Cleaning and greening of neighborhoods may be associated with increases in local real estate prices, increases in rents, and increases in housing costs such as property taxes (Banzhaf and McCormick, 2007, Curran and Hamilton, 2012, Immergluck and Balen, 2017, Conway, Li, Wolch, Kahle, and Jerrett, 2010, Nicholls and Crompton, 2005, Lindsey, Man, Payton, and Dickson, 2004, Bolitzer and Netusil, 2000). Projects with a variety of functions are associated with increases in land and housing values, including those focused on addressing environmental justice threats, such as brownfield remediation (Pearsall, 2010, Bryson, 2012, Curran and Hamilton, 2012), as well as projects focused on providing environmental amenities (Immergluck and Balen, 2017, Conway, Li, Wolch, Kahle, and Jerrett, 2010). As Wolch, Byrne, and Newell (2014) argue, "urban green space strategies may be paradoxical: while the creation of new green space to address environmental justice problems can make neighborhoods healthier and more esthetically attractive, it also can increase housing costs and property values. Ultimately, this can lead to gentrification and a displacement of the very residents the green space strategies were designed to benefit" (p. 234).

Displacement may include direct displacement (through processes such as eviction or direct rent increases); indirect or exclusionary displacement (the prevention of future low-income residents moving into a neighborhood); neighborhood resource displacement (including changing neighborhood services); and political, cultural, and social forms of displacement (including changes in community identity and governance) (Howell, 2016, Davidson, 2008, Shaw and Hahemans, 2015). In this way, housing security is often insufficient in itself to address displacement associated with loss of sense

of place and other community factors (Davidson, 2008, Marcuse, 1985, Shaw and Hagemans, 2015).

Issues of green gentrification are intertwined with trends of movement back to city centers and the promotion of downtowns as clean and attractive places to live and work. As While, Jonas, and Gibbs (2004) describe:

> "Claims about the transition to a post-industrial city have depended, in part, upon promoting images of the city as clean and attractive 'a place for business' yet devoid of factories (Short, 1999). Moreover, active environmental policies and interventions such as river restoration, the cleaning up of old industrial sites, or `eco-investment' in public transport have been significant not only in re-imaging cities, but have also been important in opening up actual urban spaces for new waves of investment and bringing back the middle classes in the city or stabilizing working-class communities (see Keil and Desfor, 1996)." (p. 550).

Issues of recognition and power also play important roles as green amenities are proposed and developed in low-income communities or communities of color. Agyeman (2013) argues that residents' perceptions of their "rights and roles in the community" are at stake as green amenities such as bike lanes are proposed in their neighborhoods. Decisions to locate the amenities, which might be considered beneficial to some, in disadvantaged neighborhoods "can be seen as part of a privileged narrative" (p. 119).

This process of environmental gentrification (Dooling, 2008), to the extent that it occurs, poses important problems for social equity in green infrastructure investments, and may be considered a negative consequence of green infrastructure relating to both the equity and economic dimensions. While issues of environmental gentrification with green infrastructure investment may pose these concerns for communities, several works have argued that networks of stakeholders at diverse levels have the potential to support more equitable development under the threat of gentrification. The following section provides

an overview of the social capital literature and its relationship to equitable outcomes in green infrastructure planning.

2.3 Social Capital and Collaborative Processes

As the previous sections have described, green infrastructure has the potential to provide benefits and opportunities to low-income neighborhoods, as well as create challenges associated with gentrification, increased housing costs, and displacement of existing residents. The literature has also described the potential for social capital to serve as a mitigating factor to both improve projects' ability to address neighborhood environmental justice concerns, minimize potential negative impacts such as gentrification, increases in housing costs, and displacement, and provide community benefits. This section of the literature review provides an overview of the literature on social capital, critiques of the concept, the impact of green infrastructure on social capital, and the impact of social capital on green infrastructure and equitable development.

2.3.1 Social Capital

2.3.1.1 Social Capital's Structural and Cognitive Components

The concept of social capital developed following the concepts of physical and human capital. The term has grown in usage since the 1980s (Bourdieu, 1986), and was popularized by Robert Putnam in the 1990s (Putnam, 1995).

Social capital is generally defined by the components of trust in relationships, reciprocity, norms, and networks (Putnam, 1995, Woolcock, 1998, Pretty and Ward, 2001). These components can be thought of as either structural or cognitive aspects of

social capital. Structural social capital refers to networks, linkages, and practices within and between communities (Grant, 2001). As Krishna and Shrader (1999) describe,

> "Structural social capital includes the composition and practices of local level institutions, both formal and informal, that serve as instruments of community development. Structural social capital is built through horizontal organizations and networks that have collective and transparent decision-making processes, accountable leaders, and practices of collective action and mutual responsibility (Bain and Hicks 1998)." (p. 10).

Further expanding the concept, Woolcock (2010) argues that structural social capital includes aspects of social ties within local communities; between local communities and groups with external and more extensive social connections to civil society; between civil society and macro-level institutions; and within corporate sector institutions, and that all of these dimensions are necessary for optimal development outcomes (Woolcock, 1998, p. 186). Similarly, Petty and Ward (2001) note that networks may include local connections between individuals and within local groups and communities; local-local connections, or connections between groups within communities; local-external connections, or vertical connections between local groups and external agencies or organizations; external-external connections, or horizontal connections between external agencies; and external connections, or connections between individuals within external agencies.

In contrast to structural aspects of social capital, cognitive social capital is less tangible and refers to values, beliefs, social norms, attitudes, and behavior that are shared among members of a community and support them in working together for a common good (Krishna and Shrader, 1999). Cognitive aspects of social capital include relations of trust, reciprocity and exchanges, and common rules, norms, or sanctions (Petty and Ward, 2001).

2.3.1.2 Individual and Collective Forms of Social Capital

Social capital was originally conceived of at the individual and small group levels as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu, 1986). In this way, the amount of social capital possessed by an individual depends on the size of his or her social network and connections, and the economic, cultural, and symbolic capital available through those connections (Bourdieu, 1986).

Coleman (1988) and Putnam (1993) developed the concept of social capital as a collective or public good. Coleman (1998) defines social capital by its function, arguing that "It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure." Putnam (1995) is credited with popularizing the concept of social capital and defines it as "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (p. 67). Putnam has included factors such as associational involvement, expression of trust in political authorities, and reading of newspapers in his measures of social capital. For Putnam, social capital can be thought of in terms of "stocks" and as a resource that groups and individuals either possess or fail to possess, rather than something that is realized by individuals (Portes, 1998, DeFelippis, 2001).

2.3.1.3 Bonding, Bridging, and Linking Social Capital

Social capital has also been discussed in terms of bonding, bridging, and linking (or bracing) forms (Osborne, Baldwin, and Thomsen, 2016, Rydin and Holman, 2004). Bonding social capital refers to social cohesion within a group structure (Grant, 2001), or linkages to others of similar socioeconomic background (Rydin and Holman, 2004, Osborne, Baldwin, and Thomsen, 2016). Bridging social capital refers to social capital that links various groups and communities (Grant, 2001), or people of different socioeconomic backgrounds (Rydin and Holman, 2004, Osborne, Baldwin, and Thomsen, 2016). Bonding and bridging social capital are both horizontal forms of social capital. Finally, linking social capital refers to vertical linkages to institutions and decision-makers (Rydin and Holman, 2004, Osborne, Baldwin, and Thomsen, 2016).

2.3.2 Critiques

One critique of the social capital concept as written about by Putnam et al (1993) is that it confuses social capital with its effects (Portes, 1998, DeFelippis, 2001). As DeFelippis (2001) argues, original definitions of social capital, such as Bourdieu (1986) distinguish between the networks an individual is embedded in and out of which social capital emerges, and the outcomes of those relationships. He notes that "social networks should not simply be equated with the products of those social capital relationships, for doing so would render invisible social networks which might be very dense but unable to generate resources because of lack of access" (p. 783-784). In this way, social capital should be separated from its outcomes.

Similarly, DeFelippis (2001) argues that recent discussions of social capital leave out discussions of power and economic capital that were originally included in

Bourdieu's concept. He argues that production and reproduction of social capital is about power and that, in simply aggregating individual characteristics up to the community level, Putnam and his followers are missing important power-laden relationships (both within communities and external linkages) which comprise social capital. As DeFelippis (2001) describes, "Simply put, certain social networks are in greater positions of power than others, and they can therefore yield much more substantial returns to their members when those networks engaged in social or political conflict. Given that people in low-income areas are marginalized in the American political economy, this is a substantial omission—and limiting factor—in the potential uses of Putnam's social capital framework in community organizing and development" (p. 791). Thus, social networks that allow individuals to realize capital and the power to retain some control of the capital are vital for community development (DeFelippis, 2001).

2.3.3 Implications for Research Design

With these critiques in mind, the research separates the constituents of social capital from its effects, defining it as social networks and their associated resources, but not as necessarily producing positive or desired outcomes for the individuals involved in its networks. This distinction allows for examination of a variety of levels of power in networks and the idea that social capital networks do not necessarily produce positive or desired outcomes, as discussed in the literature.

Further, the research design focuses primarily on community social capital over social capital at the individual level but aims to go further than simply aggregating individual-level characteristics. Through process-tracing and development of

chronologies of the development of social capital and associated outcomes in the cases, the research seeks to provide a more in-depth examination of the development and role of social capital associated with investments in green infrastructure and the development of plans, policies, and programs addressing concerns of housing affordability, gentrification and displacement, and community benefits.

The research design focuses on various types of networks as described in Woolcock (1998), including linkages within local communities; between local communities and groups with external and more extensive social connections to civil society; between civil society and macro-level institutions; and within corporate sector institutions. These connections include both bonding and bridging forms of social capital and are all forms of structural social capital. The research design also includes aspects of cognitive social capital, including reciprocity and trust.

2.3.4 Social Capital and Collaborative Processes

Social capital is both an important early outcome of collaborative planning and a precursor to mid- and long-term collaborative planning success (Innes et al, 1994). Collaborative planning, or collaborative rationality, is an alternative to traditional planning processes in which affected interests bring various perspectives together to engage in face to face dialogue and deliberate on problems (Innes and Booher, 2010). Processes may be considered collaboratively rational to the extent that participants represent diverse viewpoints on issues; the process focuses on a problem of interest to all participants; participants share interests and learn about the situation and others' interests, and consider new possibilities prior to taking positions; processes include face to face,

skillfully managed dialogue, in which all participants are empowered to speak and are listened to; dialogues include expert and community knowledge; all possibilities are open for discussion; and groups work through issues aiming to satisfy major concerns of members (Innes and Booher, 2016). Although these ideals cannot be completely achieved, processes which approximate collaborative rationality are expected to reach rational decisions in that they are well-informed, democratic, and represent collective knowing, learning, and decision-making (Innes and Booher, 2010).

The development of social capital supports the potential for serious discussion between conflicting stakeholders, creating the potential for additional positive outcomes (Innes et al, 1994). During collaborative processes, as participants develop social capital in terms of communication, stronger personal and professional relationships, and trust, they are increasingly able to share knowledge, develop shared problem definitions, understand shared interests, overcome mistrust, and negotiate other challenging issues (Innes et al, 1994, Innes and Booher, 1999). In this way, social capital is supportive of other forms of capital which support positive outcomes in consensus-building processes, including intellectual capital, or shared and agreed-upon facts and understandings that support movement toward agreement, and political capital, or alliances and agreements on proposals for mutual gain, which support adoption and implementation of group plans and policies. The following sections discuss the outcomes of social capital development in collaborative planning processes.

2.3.4.1 Intellectual Capital: Knowledge Sharing, Mutual Learning, and Higher-Quality Decision-Making

Collaborative planning literature has supported knowledge sharing and mutual learning as impacts of collaborative processes and social capital development. Participants in collaborative processes establish and strengthen relationships, which contributes to the building of trust, and also increases communication. Communication among stakeholders has the potential to lead to mutual understanding of others' interests and shared definitions of problems, as groups encounter others' perspectives and may reshape their own views (Innes and Booher, 2010). Collaborative consensus-building processes allow for sharing and integration of both hard "scientific" knowledge as well as more qualitative "soft" knowledge, leading to more accurate and meaningful knowledge (Innes and Booher, 2015). Increasing trust in others can support new norms of interaction and increased capacity for joint action (Forester, 1999). Schusler, Decker, and Pfeffer (2003) propose that factors which may improve social learning include open communication, diverse participation, unrestrained thinking, constructive conflict, democratic structure, multiple sources of knowledge, extended engagement, and facilitation.

Information sharing and mutual learning facilitate higher quality decision-making among stakeholders. The inclusion of local knowledge is critical to supporting social and environmental justice in planning processes (Innes and Booher, 2010). It may also fill information gaps, provide information about context, and offer experienced-based insights (Innes and Booher, 2010). Agreements may be of higher quality because they are more likely to be regarded as fair, take into account unique knowledge from individual stakeholders, and generate innovative ideas through discussion (Innes and Booher, 1999). Meadowcroft (2004) notes that collaborative processes may enhance the quality of

decision-making because decisions will "be substantively fairer, more adequately reflect collectively and rationally determined goals, or more successfully deploy appropriate means to secure these goals" (p. 185). In addition to formal agreements, informal agreements and understandings may also arise from collaborative processes and have the potential to positively impact outcomes and stakeholder relationships (Innes and Booher, 1999).

2.3.4.2 Political Capital: Coalition-Building and Impacts on Plans, Policies, and Programs

In addition to knowledge-sharing, individual and collective learning, and increased quality of decision-making, social capital developed through collaboration may also lead to the development of political capital through coalition-building outside of traditional governance, increased institutional resilience, and impacts on plans, policies, and programs.

Coalition building occurs when stakeholders with a variety of interests come together to explore and address community concerns. It may include bonding, bridging, or linking forms of social capital, including horizontal linkages within and across neighborhoods, as well as vertical linkages to institutions and decision-makers (Rydin and Holman, 2004). Collaborative processes may lead to the development of networks and coalitions that extend beyond the original collaboration (Innes and Booher, 2010).

In this way, collaborative processes lead to changes in systems that increase resilience of the system as a whole, as, in addition to developing agreements and joint activities, participants may extend collaboration to other contexts (Innes and Booher,

2010). Practices may emerge outside of traditional governance systems which are more adaptive in their diversity of agents and components; providing opportunity for interaction among agents; and use of effective methods for selecting appropriate actions (Innes and Booher, 2010).

New networks developed outside of traditional governance may also allow participants to accomplish goals that may not have previously been considered possible (Innes and Booher, 2010). In this way, coalitions and alliances among stakeholders are expected to increase the political capital of individual stakeholders. Agreements among coalition members may carry more political weight because of the inclusion of significant stakeholders and the use of consensus-building approaches, making them more likely to influence government-level plans, policies and programs (Innes, Gruber, Neuman, and Thompson, 1994). Knowledge sharing and mutual learning during consensus-building processes may also lead coalition members' organizations to change their actions (Innes, Gruber, Neuman, and Thompson, 1994).

2.3.4.3 Critiques of Collaborative Planning and Consensus Building

Critics have argued that a process-focused view of planning may neglect the root causes of systemic inequity and the persistent unequal outcomes that are the result of this neoliberal hegemony. Walker and Hurley (2004) critique proponents' focus on procedural questions with little consideration for the role of politics. In particular, they argue that process design may not be able to address inequities between powerful and marginalized groups. Stone (2005) and Molotch (1976) emphasize that city regimes focused around development and growth may limit the ability for groups and individuals with other ideas, such as those surrounding equity and justice, to get traction, even if

democracy is in place. Stone (2005) addresses the challenges marginalized groups face in accessing governmental power, noting that

> "For groups with a history of political, social, and economic marginality, having a political impact calls for much more than simply becoming active around a few issues of immediate concern. It calls for breaking into the "politics of investment" and becoming part of a locality's governing arrangements. Reaching such a position rests on several interrelated factors, and at the heart of them are the abilities to contribute significantly to a widely desired outcome and to enlist allies. Although politics is not a process irrevocably closed to any group, meaningful political influence rests on an ability to meet important threshold tests. For those in the lower strata of the system of social stratification, meeting those tests involves a long and difficult journey" (Stone, 2005, p. 313).

Similarly, Fainstein (2000) argues that:

> "Even where relatively powerless groups may prevail in individual instances--usually as a result of threat not simply acknowledgment of their viewpoint within a planning negotiation--they still suffer from systemic bias and typically end up with meager, often symbolic, benefits" (p. 455).

To remedy the issues surrounding neoliberal and regime planning contexts, critics have argued that planners should support context-dependent local policies favorable to the 'just city' goals of equity, diversity, and democracy (Fainstein, 2010). Types of policies and general guidelines can be identified that support social justice in planning, and planners should support these within the specific contexts of their individual cities (Fainstein, 2010). Sager (2012) echoes this view in his response to critiques of communicative planning, arguing that procedural and substantive aspects of planning should be brought closer together. He argues that planners should ensure that planning outcomes are "grounded in substantive value principles that are closely associated with the values behind the process design" (Sager, 2012, p. 5256), and must pay greater attention to structural inequities.

This idea is echoed in the environmental gentrification literature, which responds by emphasizing the importance of a focus on equitable outcomes in planning. For example, Goodling and Herrington (2014) describe a participatory watershed management effort in Portland, Oregon, that "served as a resource for sustainability minded white Portland, and remained largely irrelevant for communities of color and other groups marginalized by the "sustainable city" (p. 184). The authors argue that "Absent a focus on equity, sustainability and Complete Streets initiatives also produce incomplete Streets—those spaces both physical and socio-political in which "sustainability" and "Complete Streets" agendas fail to deliver on their social equity promises" (p. 177). Therefore, a process-focused view of planning may not be sufficient in the neoliberal and regime contexts in which planners operate, and additional focus on just outcomes of planning efforts is needed.

Collaborative planning theorists have responded to this critique by arguing that just planning processes and outcomes are integral to one another (Healey, 2003, Innes and Booher, 2015). As Healey (2003) describes,

> "concepts of the 'good' and the 'just' were themselves constructed through relations of knowledge and power. Beyond a certain level of specificity, the meaning of these concepts was both contingent and contested. This meant that the processes of articulating values and the manner in which these might become embedded in established discourses and practices were important. In other words, substance and process are co-constituted, not separate spheres (Gualini, 2001)" (p. 110-111).

Another critique of collaborative planning has been that processes may lead stakeholders to shift their goals from reaching high-quality decisions to reaching agreeable or lowest common denominator decisions (Innes and Booher, 2015). Hiller (2003) and Mouffe (1999) argued that consensus-building and collaboration ignore or

cover over conflict rather than addressing it in the way necessary for legitimate decision-making. Critics have further argued that proponents of collaborative planning and consensus building have not addressed the issue of what to do when collaborative processes produce unjust results, or the possibility that more top-down models of planning may produce positive outcomes (Fainstein, 2000).

Other critics have argued that ideal speech conditions could not be replicated in practice. Flyvbjerg and Richardson (2002) describe communicative rationality as a "utopia," arguing that increased understanding of power dynamics is more important for planners. Collaborative planning theorists have responded by arguing that although the ideals of collaborative rationality cannot be completely achieved, processes which approximate them are expected to reach rational decisions in that they are well-informed, democratic, and represent collective knowing, learning, and decision-making (Innes and Booher, 2010).

With these debates in mind, this research seeks to examine the role of collaboration and associated social capital development in supporting the development of intellectual and political capital surrounding issues of housing affordability and community benefits concerns, including knowledge sharing, mutual learning, coalition-building, and impacting policies, plans and programs surrounding housing affordability and community benefits.

2.4 Impact of Green Infrastructure on Social Capital

Research has hypothesized that green infrastructure may support social capital in a variety of ways, including active participation in the planning and management of green

infrastructure; advocacy and civic action surrounding environmental justice threats and access to environmental goods; advocacy surrounding issues of social equity and gentrification surrounding green investment; and activities and social interaction surrounding existing green spaces.

First, planning processes focused on the development of green infrastructure projects may serve as an opportunity for the development of social capital. The highly visible, multifunctional nature of projects, and the fact that projects are commonly located in the public realm, tends to attract and require the involvement of diverse stakeholder groups with interests and expertise in the environmental, economic, and social aspects and impacts of projects (Rouse and Bunster-Ossa, 2013, Benedict and McMahon, 2006). The environmental components of green infrastructure projects may attract involvement of environmentally-focused stakeholders, while the economic and social components of projects may attract stakeholders with interests in economic and social impacts. In this way, green infrastructure projects have the potential to play a unique role relative to other infrastructure projects with regard to their intersection with concerns surrounding environmental quality, urban design, and other functional concerns, such as economic development or public health. These various functions of projects often necessitate or attract the involvement of a variety of public and private entities in planning processes, including government agencies, nonprofit and advocacy groups, and neighborhood groups, involved in environmental quality, urban design, economic development, and other areas of concern.

Further, the ideology of sustainability frequently associated with green infrastructure projects often emphasizes public participation and addressing community

needs. In this way, communities may expect green infrastructure projects to include a significant public participation component, and public participation is considered a key component of green infrastructure planning (Rouse and Bunster-Ossa, 2013), although the quality and level of engagement may vary among projects (Wilker and Rymsa-Fitschen, 2016). As discussed in the previous sections, the collaborative planning literature has described the potential for collaborative consensus-building processes to develop social capital among participants, which has the potential to lead to knowledge sharing, mutual learning, higher quality decision-making, and to support advocacy impacting plans, policies, and programs (Innes, Gruber, Neuman, and Thompson, 1994). The development of public support may also be necessary for the development of projects that don't have pre-existing funding sources, as projects may be funded through mechanisms requiring public approval.

Yet, whether green infrastructure projects do in fact support the development of social capital may depend on additional factors such as participation approaches and institutional design (Rydin and Pennington, 2000). As Rydin and Pennington (2000) describe, institutional design and patterns of governance "shape the ways in which actors within a community will interact over the medium to long term," thus shaping the potential for the development of social capital (p. 163). Different strategies for public participation in environmental planning, including environmental management, environmental governance, and collaborative environmental planning, and the institutional designs associated with these strategies vary in the potential for supporting the development of social capital in communities (Rydin and Pennington, 2000).

In addition to stakeholder involvement and the ideology of sustainability, the environmental justice literature has also discussed a history of social capital development surrounding green infrastructure with regard to environmental justice concerns such as the cleanup of toxics and access to environmental amenities (Sze and London, 2008, Brulle and Pellow, 2006). With the expansion of the environmental justice agenda from a focus on addressing environmental bads to obtaining access to environmental goods and services, amenities such as parks, green infrastructure, fresh food, and affordable housing, environmental justice advocacy has become more multi-faceted, allowing for the engagement of a variety of groups around diverse issues and projects (Anguelovski, 2015). In this expanded perspective of environmental justice, parks and green infrastructure may serve as a rallying point for environmental justice advocacy around eliminating environmental bads, such as flooding, as well as obtaining access to environmental goods, such as parks and recreation and transportation opportunities.

Green urban development may also serve as a catalyst for the development of social capital surrounding gentrification, displacement, and community benefits concerns (Anguelovski, 2015, Curran and Hamilton, 2012, Agyeman, 2013, Zavestoski and Agyeman, 2014). Neighborhood groups and residents have developed coalitions with the goal of shaping projects and their impacts on neighborhood housing affordability, gentrification, and community benefits, such as workforce development and job opportunities for neighborhood residents (Curran and Hamilton, 2012).

Finally, green infrastructure may support social capital through opportunities for interaction on the spaces themselves. Projects such as community forestry, gardens, and farms may engage community members through allowing for participation in planning,

management, and training for civic participation, which can contribute to resilience building (Tidball and Krasny, 2009). Urban green spaces have been noted for their ability to bring together people from diverse backgrounds around shared interests and activities such as gardening, concerts and art performances, or workshops initiated by community members on green spaces (Colding and Barthel, 2011, Tidball and Krasny, 2009). Spaces such as gardens may also be important sources of employment, income, and food, as well as safe spaces for socialization and cultural activities.

For these reasons, green infrastructure planning may support the development of social capital around issues of project design and implementation, as well as concerns associated with environmental justice, housing affordability, gentrification, and community benefits associated with green infrastructure projects.

2.5 Impact of Social Capital and Collaborative Processes on Green Infrastructure Planning

While green infrastructure planning might support the development of social capital, collaborative processes and social capital may also in turn shape green infrastructure planning. The idea that participation and social capital might support sustainability planning and sustainable development has a strong foundation in planning literature. Portney and Berry (2010) argue that participation and social capital are critical in supporting cities in engaging in sustainability planning, as these initiatives 1) tend to require community buy-in, deliberation surrounding a wide range of policies that might be implemented and costs that might be incurred, and the overcoming of stakeholders against implementing such policies; 2) deal with community goods associated with

reducing negative externalities, which can be addressed through consensus building processes; and 3) tend to be facilitated by the direct involvement of ordinary residents in the policy-making process, counter to business interests which may be antagonistic to environmental policies. Further, Rydin and Holman (2004) argue that social capital addresses several barriers to the implementation of sustainable development policy, including lack of participation, lack of stakeholder interest in sustainability concerns; conflicts over definitions of sustainability; lack of resources and capacity; and lack of cooperation between stakeholders. Social capital addresses these barriers by altering incentives for participation; facilitating links between stakeholders who can persuade others of the benefits of sustainable development policy; building links between stakeholders to facilitate consensus on sustainable development definitions and support sharing of resources and capacity; and alter incentives for cooperation between stakeholders (Rydin and Holman, 2004). In these ways, social capital and collaborative process are facilitative of sustainability planning in general.

Several works have suggested the importance of social capital in supporting equitable outcomes in planning around issues of housing affordability, gentrification, and community benefits, and in planning and for green infrastructure in particular. Howell (2016), in her case study of the Columbia Heights neighborhood in Washington, D.C., argues that interactions among diverse groups of actors, including residents, advocacy groups, and government, have supported resistance to gentrification, provided representation for the needs of low-income residents, and helped tenants advocate for themselves. Networks among these diverse groups, and the inclusion of grassroots and advocacy actors in particular, allowed for the institutionalization of policies to support

what had previously been only a discursive right to the city for marginalized groups. For example, the tenants' rights movement and protests in gentrifying neighborhoods put pressure on the city council to pass legislation to mitigate the impacts of gentrification and allow residents to stay in place, including the Rental Housing Conversion and Sale Act of 1980. This act included the Tenant Opportunity to Purchase Act, which provides tenants a collective first right of refusal to purchase their buildings when they go on the market, as well as rent control and condo conversion laws (Howell, 2016). Further, the District government funded housing acquisition and rehabilitation as well as attorneys and tenant organizers, which led to the development of "a significant support system of tenant organizers, affordable housing developers and policy advocates" (Howell, 2016, p. 215). Many groups which emerged from this system now participate in the Coalition for Nonprofit Housing and Economic Development, which has been active in advocating for greater resources for affordable housing development, including the city's Housing Production Trust Fund (Howell, 2016), which currently receives $100 million per year for affordable housing preservation and development (DC Department of Housing and Community Development, n.d.). In this way, a combination of government, advocacy, and grassroots efforts have supported policies and practices that have supported more equitable development in the face of gentrification and displacement.

Similarly, Curran and Hamilton (2012) argue that residents and neighborhood activists in Greenpoint, Brooklyn, developed strategic alliances at a variety of scales to work toward achieving the cleanup of Newtown Creek while also maintaining industry and working class jobs in the neighborhood, a vision the authors describe as "explicitly classed, recognizing the historical injustices that created a neighbourhood so polluted in

the first place and demanding that these be righted for the direct benefit of those who suffered through it" (p. 1039). The Newtown Creek Brownfield Opportunity Area program (BOA), a partnership between the Newtown Creek Alliance, Riverkeeper, and the Greenpoint Manufacturing and Design Center, a non-profit industrial developer, is supported by a state program that provides grants to local governments and community groups to develop strategies for brownfield redevelopment. As the authors describe,

> "the vision that the BOA is helping to foster is not about the transformation of vacant toxic sites, but rather the cleaning up of a still-viable working class neighbourhood in order to protect public health, initiate ecological regeneration, and maintain and increase industrial uses of the area. This vision fits with the literature that suggests that projects that fit the existing character of a neighbourhood are less likely to trigger gentrification (Banzhaf and McCormick 2007), and that the maintenance of working-class jobs can also act as a gentrification buffer (Walks and August 2008)" (Curran and Hamilton, 2012, p. 1036).

The alliances among actors at a variety of scales in resisting gentrification and displacement make Greenpoint and Newtown Creek "a case study in the messy contextual politics of sustainability that offer the possibility, if not a guarantee, of the potential for a democratic and socially just way to rethink the green city" (Curran and Hamilton, 2012, p. 1039).

Although discussions around the impacts of social capital on green infrastructure in particular have so far been limited, cases such as these demonstrate the potential for social capital to support equitable visions and outcomes for green infrastructure investment. This research seeks to add to this discussion surrounding the role of social capital and collaboration in supporting the institutionalization of policies addressing concerns associated with housing affordability, displacement, and community benefits surrounding green infrastructure investments.

2.6 Contextual Factors

Contextual factors, such as the variety of actors involved in planning and decision-making; project and city-level resources available for green infrastructure planning, collaborative planning processes, and support for affordable housing preservation and development; race and socioeconomic status of neighborhoods surrounding projects; and state and local political context are also important to consider in examining potential roles for social capital in supporting more equitable planning and development surrounding green infrastructure.

2.6.1 Actors

A multitude of actors may have agency or power in planning and decision-making at the intersection of green infrastructure, the development of social capital, and concerns associated with gentrification and displacement. Actors may include state and local government agencies; civic actors such as community organizations, grassroots and advocacy groups, and residents; and private sector actors, such as developers, landowners, and corporate or business actors (Howell, 2016, Benedict and McMahon, 2006). The varied roles these actors play shape their interactions and the potential for the development of social capital surrounding equitable development concerns.

State and local government actors are one set of actors that play a role in the interactions between green infrastructure, development of social capital, and outcomes surrounding gentrification and displacement concerns. Historically, government and planning agencies considered urban planning as a technical activity to be conducted by experts using rational analysis (Meyerson and Banfield, 1955). While planning and

governance have evolved to focus more extensively on community-based planning strategies, the voices of certain actors—often those focused on a pro-growth agenda--may be privileged over others in government decision-making, while marginalized groups have limited access (Stone, 1989, 2005). Even in this context, state and local government actors may serve to support the institutionalization of rights through policy development in areas such as affordable housing (Howell, 2016).

Grassroots, advocacy, and community-based organizations are another group of actors involved in this set of interactions. These groups may be actively involved in the planning and management of green infrastructure (Benedict and McMahon, 2006) or in advocating for policies and strategies to address gentrification and displacement concerns (Howell, 2016). In these roles, community organizations may serve as links between residents and government actors and to increase understanding of community strengths and challenges (Holston, 1995). Further, interactions among community organizations and local government actors may support rights for marginalized groups through the institutionalization of policies surrounding issues of equitable development (Howell, 2016).

Finally, private sector actors, including corporate actors, businesses, and developers, often shape interactions and outcomes surrounding issues of green infrastructure, social capital, and gentrification and displacement concerns. Urban regimes focused on growth and development often privilege the voices of private sector actors such as developers and land owners in decision-making, and the devolution of federal funds to the local level since the 1970s has given increasing power to these actors in shaping local housing policy and zoning regulations (Stone, 1989). In shaping urban development and

policy environments, these actors are also often primary in shaping housing affordability, gentrification, and displacement. Private sector actors may shape green infrastructure planning in particular through financial support for the development and management of projects and land control (Benedict and McMahon, 2006).

2.6.2 Race and socioeconomic status

With regard to race and class, the environmental justice literature notes race and socioeconomic status as associated with proximity to environmental 'bads' such as toxics and unwanted land uses. The expanded view of environmental justice that has examined access to environmental 'goods,' such as parks and transportation, has also noted disparate access for low-income communities and communities of color. Yet, investments in green amenities in these communities may also create concerns along racial and socioeconomic lines. The environmental gentrification literature argues that low-income communities and communities of color may perceive investments in green infrastructure, complete streets, and other 'green' projects as threatening with regard to the potential for gentrification and displacement of existing neighborhood residents. These contextual factors may be especially important in highly segregated urban environments, as investments in green infrastructure may result in the "simultaneous greening and whitening" of neighborhoods surrounding the amenities (Checker, 2011, p. 216), potentially leading to a reduction of residents' "rights and roles in the community" if projects are completed without a significant role for neighborhood leadership (Agyeman, 2013, p. 119).

2.6.3 State and local political context

State and local political context is another factor that may shape the ways in which the development of social capital surrounding housing affordability, gentrification and displacement, and community benefits concerns is able to impact plans, policies, and programs affecting these concerns. State and local support for and local autonomy to implement policies, plans, and programs surrounding these concerns would be expected to shape the potential for social capital to impact these issues. Further, a city's existing affordable housing and community benefits plans, policies, and programs provide a starting point from which groups may further advocate for and implement additional plans, policies and programs surrounding these issues. In this way, cities with stronger policies surrounding affordable housing, gentrification and displacement, and community benefits concerns to begin with could allow project- and neighborhood-level actors to develop plans and programs working in coordination with these existing housing policies.

2.7 Gaps and Implications for Research

The literature review suggests that relationships exist between green infrastructure, neighborhood environment and health qualities, and land and housing markets. Investments in green infrastructure may address environmental justice goals, such as stormwater management, clean air and water, and social, recreational, and cultural opportunities, among others. Yet, these investments may also increase land and housing values and costs, creating concerns for housing affordability, gentrification, and displacement in surrounding neighborhoods. In this way, green infrastructure, with its potential to address environmental justice threats while also leading to environmental gentrification, may have both positive and negative impacts on low-income neighborhoods. Critics arguing from the environmental gentrification perspective propose

that planning processes are dominated by economic interests, while equity concerns such as housing affordability, displacement, and workforce development are not prioritized in project development. Arguments from the social capital perspective propose that social capital networks between diverse actors may serve as a mitigating factor to gentrification processes, supporting the potential for equitable development surrounding green infrastructure projects.

These debates continue to occur, as discussions are incomplete surrounding the conditions under which more equitable outcomes might be supported and have focused primarily on examining the tensions between the environmental benefits and challenges posed by investments in green infrastructure. Research has not fully examined how social capital processes might be part of green infrastructure planning in ways that result in equitable outcomes, including the ways in which green infrastructure development might support the development of social capital surrounding issues of equity, such as housing affordability, gentrification and displacement, and community benefits. Further, it has not provided an in-depth examination of the mechanisms through which social capital networks and collaboration shape green infrastructure projects and the institutionalization of policies, plans, and programs aimed at addressing issues of housing affordability, gentrification and displacement, and community benefits. These gaps in existing research inform the study's goals and research design.

The literature review also shapes the study's conceptual framework and research design, which are described in the following chapters. As described in the literature review, social capital is an important early outcome of collaborative planning and a precursor to mid- and long-term collaborative planning success (Innes, 1994). Yet, social

capital may also develop outside of official collaborative consensus-building processes, through interactions between grassroots, advocacy, and government actors (Howell, 2016). With this in mind, the research design aims to consider social capital development both within and outside of official collaborative planning processes.

With regard to examining the development of social capital, the literature suggests several important factors for the research design. First, the research separates the constituents of social capital from its effects, defining it as social networks and their associated resources, but not as necessarily producing positive or desired outcomes for the individuals involved in its networks. This distinction allows for examination of a variety of levels of power in networks and the idea that social capital does not necessarily produce positive or desired outcomes, as discussed in the literature review. The research design focuses on various types of networks as described in Woolcock (1998), including linkages within local communities; between local communities and groups with external and more extensive social connections to civil society; between civil society and macro-level institutions; and within corporate sector institutions. These connections include both bonding and bridging forms of social capital and are all forms of structural social capital. The research design also includes aspects of cognitive social capital, including reciprocity and trust. The proposed outcomes of social capital development and collaborative processes, including active involvement of a variety of stakeholders, mutual learning, and higher-quality decision-making that incorporates a variety of interests, form the basis of the research propositions.

CHAPTER 3. CONCEPTUAL FRAMEWORK

The conceptual framework included here (see Figure 11) shows the proposed relationships between social capital, environment and health quality, land and housing markets, and green infrastructure, and the impacts of these interactions on low-income communities. Environmental quality, land and housing markets, and social capital interact through green infrastructure investment.

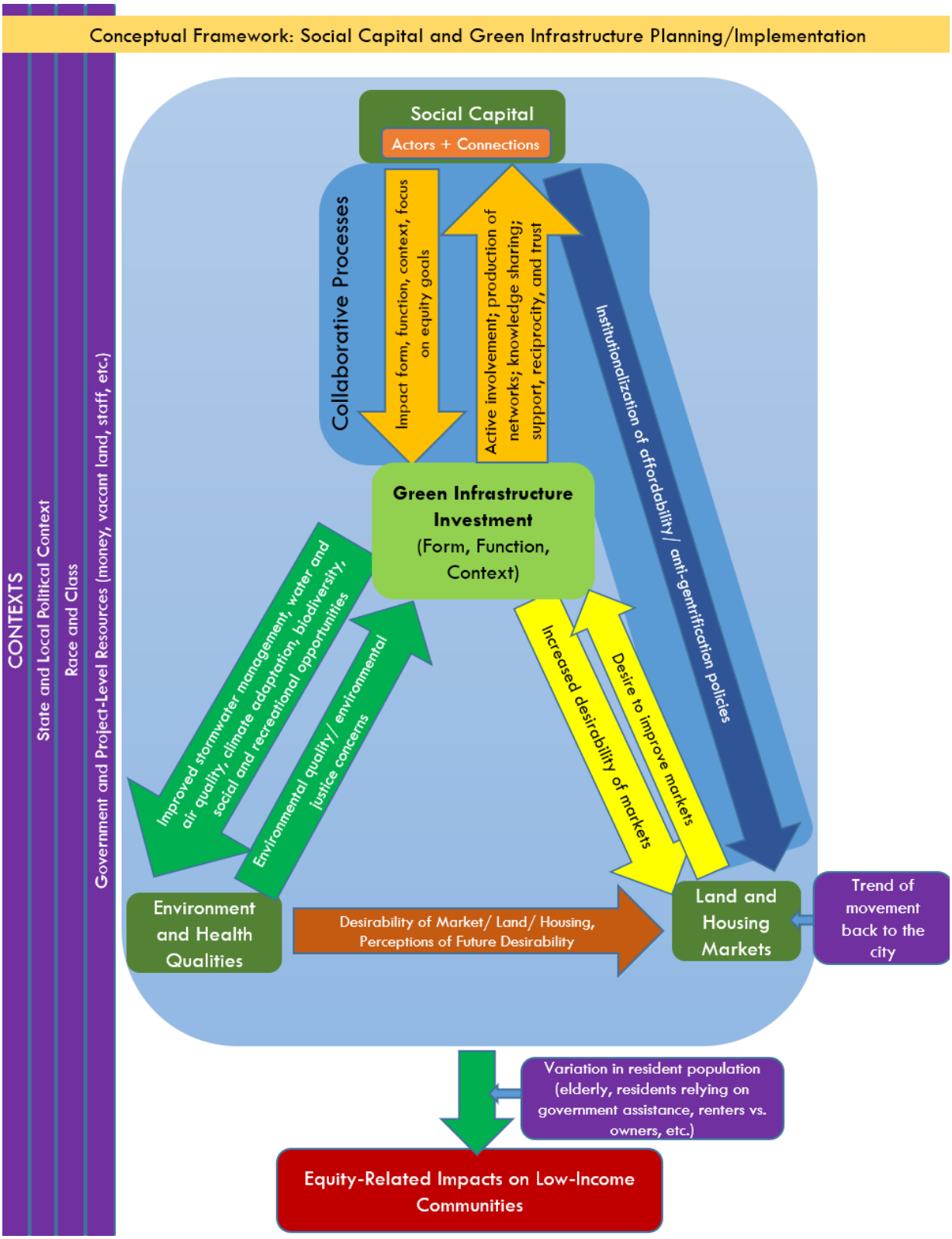


Figure 11: Conceptual framework

3.1 Model Element 1: Green Infrastructure Investment

Green infrastructure is defined by the features of connectivity, multifunctionality, and increased green space (Wright, 2011). As described in the literature reviews, green infrastructure projects vary based on their form, function, context, and the ecological, economic, and social elements of these aspects (Mell, 2010), as well as the planning processes and models employed (Maruani and Amit-Cohen, 2007). The form of projects includes visual characteristics of projects such as their level of visual as opposed to functional 'greenness' (e.g., parks versus cycle paths) (Davies, 2006, Mell, 2013). Functions of green infrastructure projects range from the ecological, such as protection of intact landscape elements or environmental remediation (Ahern, 2007), to the economic, such as redevelopment, to social functions, such as recreation or public health improvement (Mell, 2010). The context of projects includes aspects such as location, motivations, perceptions, costs, potential for economic development, and ecological factors surrounding projects, among other considerations (Mell, 2010). Green infrastructure is also defined by planning processes employed, and stakeholder groups and interests involved in planning processes (Kambites and Owen, 2006, Benedict and McMahon, 2006, Young, 2011). The green infrastructure projects selected for this case study include variation in these elements of form, function, context, and planning process in order to examine social capital development surrounding diverse green infrastructure investments.

3.2 Model Element 2: Relationship Between Green Infrastructure and Environmental and Health Qualities

Green infrastructure is also supportive of environment and health qualities in that it may be designed to address neighborhood environment justice threats, such as flooding, as well as to improve access to environmental amenities, such as parks or transportation opportunities. Green infrastructure has the potential to address environmental justice concerns such as improving air and water quality; managing stormwater (Hoyer, Dikhaut, Kronawitter, and Weber, 2011); adapting to climate change impacts (Gill, Handley, Ennos, and Pauleit, 2007, Stone, 2012, Norton et al, 2015); and supporting biodiversity (Tzoulas et al., 2007, Forman, 2008). In addition to addressing environmental justice threats, green infrastructure may also provide a range of environmental and health benefits, such as access to parks, recreation opportunities, and nature; alternative transportation opportunities (Conine, Xiang, Young, and Whitley, 2004); improvements in physical and mental health and wellbeing (Beatley, 2011, Wolch, Byrne, and Newell, 2014, Chawla, 2015, Cheisura, 2004); and opportunities for food production (Agyeman, 2013) and local economic development (Rouse and Bunster-Ossa, 2013, Ahern, 2007). Improvements in environment and health qualities of neighborhoods through investment in green infrastructure has been associated with increasing values in land and housing markets.

3.3 Model Element 3: Relationship Between Green Infrastructure and Land and Housing Markets

Green infrastructure is often supportive of increases in values in land and housing markets. Green urban projects such as parks, greenways and trails, and riverfront restoration projects have played a prominent role in catalyzing new investment in cities and in increasing property values (Immergluck and Balen, 2017, Conway, Li, Wolch,

Kahle, and Jerrett, 2010, Nicholls and Crompton, 2005, Lindsey, Man, Payton, and Dickson, 2004, Bolitzer and Netusil, 2000). Projects with a variety of functions are associated with increases in land and housing values, including those focused on addressing environmental justice threats, such as brownfield remediation (Pearsall, 2010, Bryson, 2012, Curran and Hamilton, 2012), as well as projects focused on providing environmental amenities (Immergluck and Balen, 2017, Conway, Li, Wolch, Kahle, and Jerrett, 2010). The trend of movement back to city centers has also put increasing pressure on housing markets and depends in part on promoting cities as clean and attractive places to live and work (While, Jonas, and Gibbs, 2004).

3.4 Model Element 4: Relationship Between Green Infrastructure and Social Capital

3.4.1 Green Infrastructure's Impact on Social Capital.

Investment in green infrastructure may lead to increases in social capital by supporting high levels of discourse between a variety of actors and the organization of residents and community groups surrounding issues of equitable planning and implementation. Green infrastructure investment may support social capital development through activities and social interaction surrounding existing green spaces (Tidball and Krasny, 2009, Colding and Barthel, 2011); active participation in the planning and management of green infrastructure (Tidball and Krasny, 2009); advocacy and civic action surrounding environmental justice threats and access to environmental goods (Anguelovski, 2015); and advocacy surrounding issues of social equity and gentrification surrounding green investment (Curran and Hamilton, 2012, Anguelovski, 2016).

3.4.2 Social Capital's Impact on Green Infrastructure.

The outcomes of social capital development include the building of relationships, trust, and reciprocity; the incorporation of a variety of interests; knowledge sharing; and mutual learning, which are expected to increase quality of decision-making (Innes, Gruber, Neuman, and Thomson, 1994, Innes and Booher, 1999). Social capital networks of diverse groups of actors may support resistance to gentrification and a focus on ensuring that current residents benefit from new investments (Curran and Hamilton, 2012, Howell, 2016). The elements in the conceptual framework form the basis for the hypotheses discussed in the following section.

CHAPTER 4. RESEARCH QUESTIONS, HYPOTHESES, AND RESEARCH DESIGN

This section of the dissertation describes the study's research questions, hypotheses, and the study's multiple case study design. The research questions and hypotheses draw from the literature surrounding green infrastructure, social capital, collaborative planning, and environmental gentrification to as questions and make claims about relationships in the conceptual framework.

4.1 Research Questions

The study's research questions include:

1. *How does green infrastructure planning shape the development of social capital?* Here, social capital development refers to social capital developed both within and outside project planning efforts.
2. *How does social capital shape green infrastructure planning and equitable development?* Shaping green infrastructure planning and equitable development could include shaping projects themselves and their planning processes, as well as institutionalization of policies and strategies addressing housing affordability, gentrification and displacement, and community benefits.
3. *How do actors external to neighborhoods interact with actors internal to neighborhoods to support or inhibit the development of policies and strategies addressing housing affordability, gentrification and displacement, and community benefits concerns?* Actors external to neighborhoods may include groups such as

city-level government agencies, external private sector actors, external advocacy groups. Actors internal to neighborhoods may include groups such as neighborhood-level government actors, internal private sector actors, neighborhood-level community organizations and advocacy groups.

4. *What role do state and local policies, procedures, and institutions play in shaping the ability of project-, neighborhood, and city-level actors to develop and implement policies and strategies addressing housing affordability, gentrification and displacement, and community benefits concerns?* This question focuses on how state and local political contexts, including the willingness of local government to engage in planning and policy development surrounding housing affordability, gentrification and displacement, and community benefits concerns, and their level of autonomy to implement plans and policies that are developed.

4.2 Hypotheses

Drawing from the literature surrounding green infrastructure, social capital, collaborative planning, and environmental gentrification, the study's hypotheses aim to address these research questions and make claims about the relationship between green infrastructure and social capital. They are based on the study's literature review and conceptual model, focusing on the impact of green infrastructure planning on social capital (hypotheses 1 and 2); the impact of social capital on green infrastructure planning (hypothesis 3); the impact of social capital on policy surrounding housing affordability, displacement, and community benefits, and the roles of actors internal and external to neighborhoods (hypothesis 4); and contextual factors of governance and political context

(hypothesis 5). This section details hypotheses and sub-claims associated with the study's research questions.

Hypotheses 1 and 2 aim to address the first research question, "How does green infrastructure shape the development of social capital?" In particular, Hypothesis 1 focuses on social capital development within green infrastructure planning efforts.

Hypothesis 1: Green infrastructure planning processes increase social capital amongst neighborhood residents and stakeholders.

This hypothesis could be evaluated by examining the data for the presence of multiple factors, including but not limited to: demand on information and learning amongst stakeholders associated with projects; the extent to which projects employ participatory planning to engage in information sharing and learning amongst stakeholders associated with a project; the variety of stakeholder participating in the planning, design, and implementation of green infrastructure projects; and the degree to which information sharing and learning occurs, with stakeholders focused not only on green infrastructure projects but also the impacts of those projects on each of the stakeholder groups. In examining these factors and remaining open to others that may emerge during data analysis, hypothesis 1 examines the extent to which green infrastructure planning processes support the development of social capital.

Next, hypothesis 2 focuses on the development of social capital outside of project planning efforts. As the development of social capital may not be constrained to project planning efforts, this hypothesis allows for the examination of the development of social capital outside of these efforts (e.g., among neighborhood in inter-neighborhood grassroots or advocacy groups, neighborhood residents, or private sector actors).

Hypothesis 2: The planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that lead to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.

This hypothesis could be evaluated by examining the data for the presence of multiple factors, including but not limited to: The extent to which green infrastructure projects improve environmental characteristics of neighborhoods in which they are developed, thus providing opportunities to local residents; the extent to which improvements in environmental values within neighborhoods can lead to increases in housing costs, gentrification, and displacement, thereby posing a threat to local residents; and the extent to which residents, community groups, and other actors respond to these opportunities and threats by participating in green infrastructure planning processes, sharing information, and building coalitions surrounding affordability, gentrification, and community benefits concerns.

Hypotheses 3 and 4 aim to address the second research question, “How does social capital shape green infrastructure planning and equitable development?” This question focuses on the impact of social capital on green infrastructure with regard to the incorporation of housing affordability, gentrification, displacement, and community benefits concerns into projects, project-level plans, and planning processes, and the development of plans, programs, and policies addressing these concerns outside of project-level efforts. Hypothesis 4 also aims to address the third research question, “What role do actors external to neighborhoods play relative to internal neighborhood actors in

supporting the development of policies and strategies addressing housing affordability, gentrification and displacement, and community benefits concerns?"

In particular, hypothesis 3 focuses on the impact of social capital on green infrastructure with regard to the incorporation of housing affordability, gentrification, displacement, and community benefits concerns into projects and project-level plans and planning processes.

Hypothesis 3: Increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these projects and their planning processes.

This hypothesis could be evaluated by examining the data for the presence of multiple factors, including but not limited to: the extent to which mutual learning in coalitions and planning processes surrounding issues of project design, gentrification, displacement, and community benefits concerns lead to the building of support and pressure to address these concerns in planning efforts; the extent to which the building of support and pressure to address design, housing affordability, displacement, and community benefits concerns leads to efforts to address these concerns in project-level planning efforts; and the extent to which knowledge sharing and mutual learning in coalitions and planning processes therefore support decision-making that reflects collectively determined goals of a wide range of interests with regard to project design, implementation, and concerns associated with gentrification, displacement, and community benefits.

Next, hypothesis 4 focuses on the impact of social capital on green infrastructure planning with regard to the development of policies and strategies surrounding issues of

housing affordability, gentrification, displacement, and community benefits. Hypothesis 4 also examines the roles of actors internal and external to neighborhoods in the development of policies and strategies surrounding these concerns.

Hypothesis 4: Increases in social capital among actors internal to neighborhoods surrounding issues of housing affordability, gentrification, and community benefits concerns will lead actors external to neighborhoods to develop and implement policies and strategies to address these concerns.

This hypothesis could be evaluated by examining the data for the presence of multiple factors, including but not limited to: the extent to which internal and external neighborhood actors serve as voices for neighborhood-level concerns; the extent to which internal and external groups put pressure on city leadership to address these concerns in policies and strategies; the extent to which, as pressure to address these concerns increases, government leaders take actions and develop policies, programs, and strategies to address them in some way; and the extent to which internal and external actors shape projects and their planning processes directly through advocating for neighborhood concerns.

Finally, hypothesis 5 seeks to address the fourth research question, "What role do state and local policy context play in affecting the ability of project-, neighborhood, and city-level actors to develop and implement policies and strategies addressing housing affordability, gentrification and displacement, and community benefits concerns?" This question aims to clarify the role of political context in shaping the potential for social capital to support the development of plans, policies, and programs surrounding housing affordability, gentrification and displacement, and community benefits concerns.

Hypothesis 5: State and city-level political and policy support of housing affordability, gentrification and displacement, and community benefits concerns will strengthen neighborhood and project-level actors' capacities to develop and implement strategies in these areas.

This hypothesis could be evaluated by examining the data for the presence of multiple factors, including but not limited to: the extent to which political context, including state-level policies, existing city-level policies, and city political autonomy provides a framework within which neighborhood and project-level actors are able to develop and support strategies, plans, policies, and programs surrounding housing affordability, gentrification and displacement, and community benefits associated with investments in green infrastructure; and the extent to which political contexts in which there exists greater local autonomy and/or a supportive framework for housing affordability facilitates neighborhood and project-level actors in successfully pressing for an implementing strategies to address housing affordability, gentrification and displacement, and community benefits concerns associated with investments in green infrastructure. The study's multiple case study design was developed to test these hypotheses and is discussed in the following section.

4.3 Multiple Case Study Design

This study seeks to identify interactions between elements of the green infrastructure—environmental improvement—housing market nexus, with a particular focus on impacts to low-income communities. As such, it examines processes of community organizing, planning and decision-making within the context of low-income

communities and for the design and implementation of green infrastructure projects. The need for a holistic exploration of these processes and events suggest the use of a case study research design. Case studies are used to investigate contemporary phenomena in their real-life contexts and are especially suitable for "how" or "why questions and in situations in which the boundaries between the phenomenon being studied and its context are unclear (Yin, 2014). Thus, the holistic exploration of processes and phenomena is especially important. The case study design allows for flexibility and holistic exploration of the individual cases in the study (Yin, 2014).

The project uses a multiple case study design. Theoretical propositions guide the development of case studies by shaping research questions, the literature review, data collection, and the selection of analytic strategies (Yin, 2014). The propositions included in the hypotheses focus the study on the proposed relationships between green infrastructure, social capital, environment and health qualities, land and housing markets, and equitable development plans, policies, and programs in green infrastructure planning. These propositions help shape the study and allow for testing of specific hypotheses; however, the case study design also allows the researcher to remain open to exploring potentially important variables that are not included in propositions. In this study, the design focuses on testing of the theories of social capital and green infrastructure included in the conceptual framework, while its focus on holistic exploration also allows for examination of other potentially important impacts of social capital.

4.4 Case Selection

The hypotheses developed from the conceptual framework suggest that the cases should include cities with a prominent focus on green infrastructure planning, and that cases should allow for variation in political context and in project scale and form. The case cities of Atlanta, GA, and Washington, DC provide variation with regard to political context and level of local autonomy for engaging in the development of policies surrounding housing affordability, gentrification and displacement, and community benefits (see Table 1). In selecting the cases, variation in political context is important for understanding the differences in the impact of green infrastructure and social capital under varying political conditions, which differ in level of local autonomy and in the development of state and local policies surrounding housing affordability, gentrification and displacement, and community benefits. Variation of the cases in this way, while keeping other important factors constant, makes it possible to examine the role of political context in supporting or inhibiting the ability of neighborhood and project-level actors to develop and implement strategies to address concerns associated with housing affordability, gentrification and displacement, and community benefits.

The case cities were selected for their similarities in other areas of concern. The selected case cities are both actively engaged in green infrastructure planning, allowing for the study of a variety of planning efforts, which include variation in form and scale, function, and context. The cities also have similar dynamics of spatial inequality with segregation by race and income, and with regard to increasing market pressures in previously low-market areas surrounding green infrastructure projects that are in the process of being planned or developed.

Table 1: Case selection

City with Weaker Affordable Housing Policies and Lesser Autonomy to Enact such Policies in the Future	**City with Stronger Affordable Housing Policies and Greater Autonomy to Enact such Policies in the Future**
Green infrastructure on Atlanta's Westside (English Avenue, Vine City, Washington Park, Grove Park, Bankhead neighborhoods)	Green infrastructure east of the river; Washington DC (Anacostia, Fairlawn, Buena Vista, Barry Farm, Congress Heights, St. Elizabeth's neighborhoods)

Within the case neighborhoods, I selected sets of neighborhoods to serve as subcases (see Table 1). Selecting groups of neighborhoods allows the research to examine collective efforts that occur at a larger scale than individual neighborhoods but at a smaller scale than the city as a whole. In this way, the study examines activities of inter-neighborhood organizations and actors which bridge and coordinate neighborhood-level efforts. Sub-cases in Atlanta include a subset of neighborhoods on the Westside of Atlanta, including English Avenue, Vine City, Washington Park, Grove Park, and Bankhead, and the green infrastructure projects being planned or developed (or that have recently been developed) within the area (see Figure 12). This selection of neighborhoods allows for the examination of a contiguous subset of the larger Atlanta Westside that includes planning and implementation of a variety of green infrastructure projects.

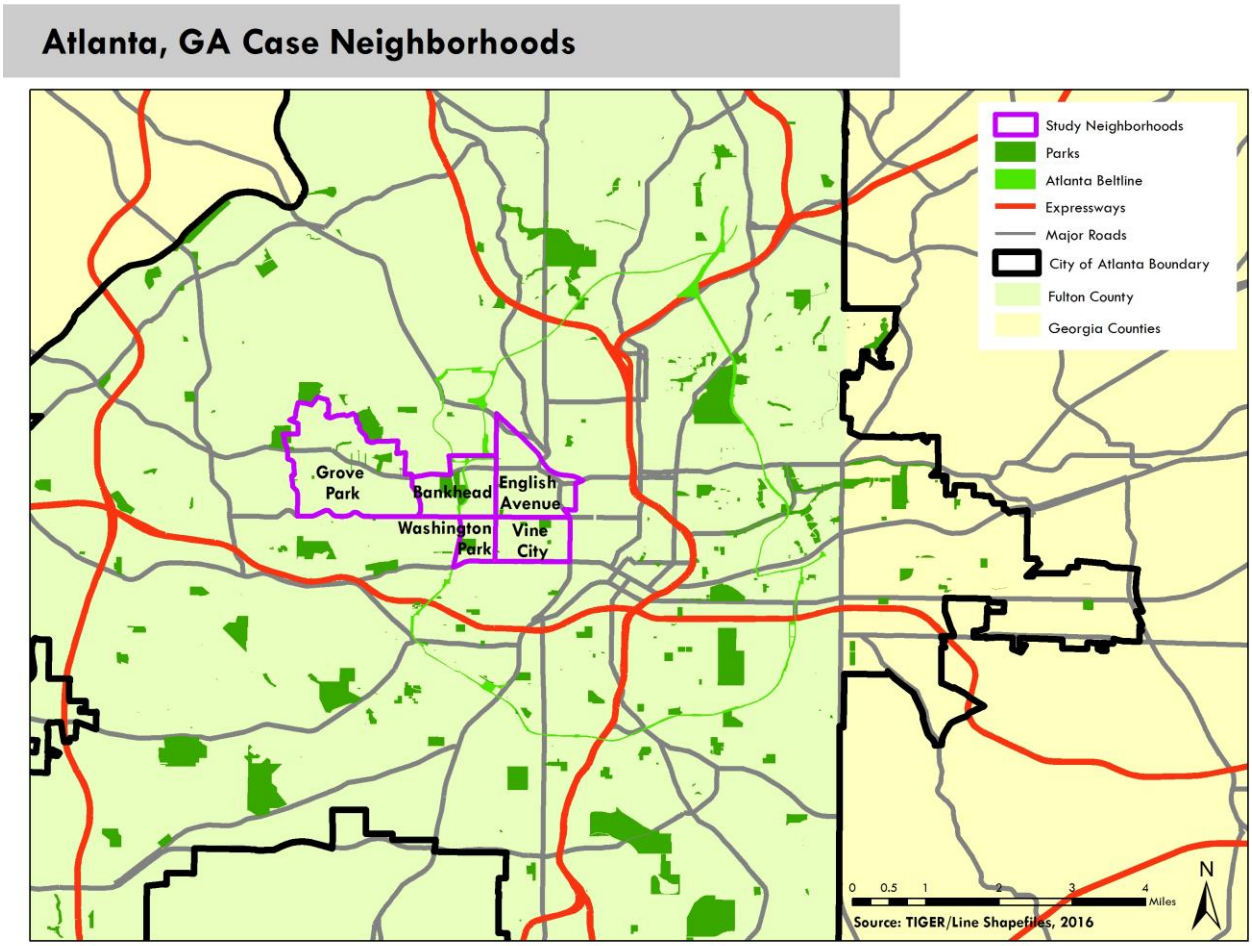


Figure 12: Atlanta, GA Case Neighborhoods including English Avenue, Vine City, Washington Park, Bankhead, and Grove Park

The subset of neighborhoods of focus for the Washington, D.C. case are the Anacostia, Fairlawn, Barry Farm, Congress Heights, Buena Vista and St. Elizabeth's neighborhoods (see Figure 13). The neighborhoods are part of the Ward 8 area located east of the Anacostia River.

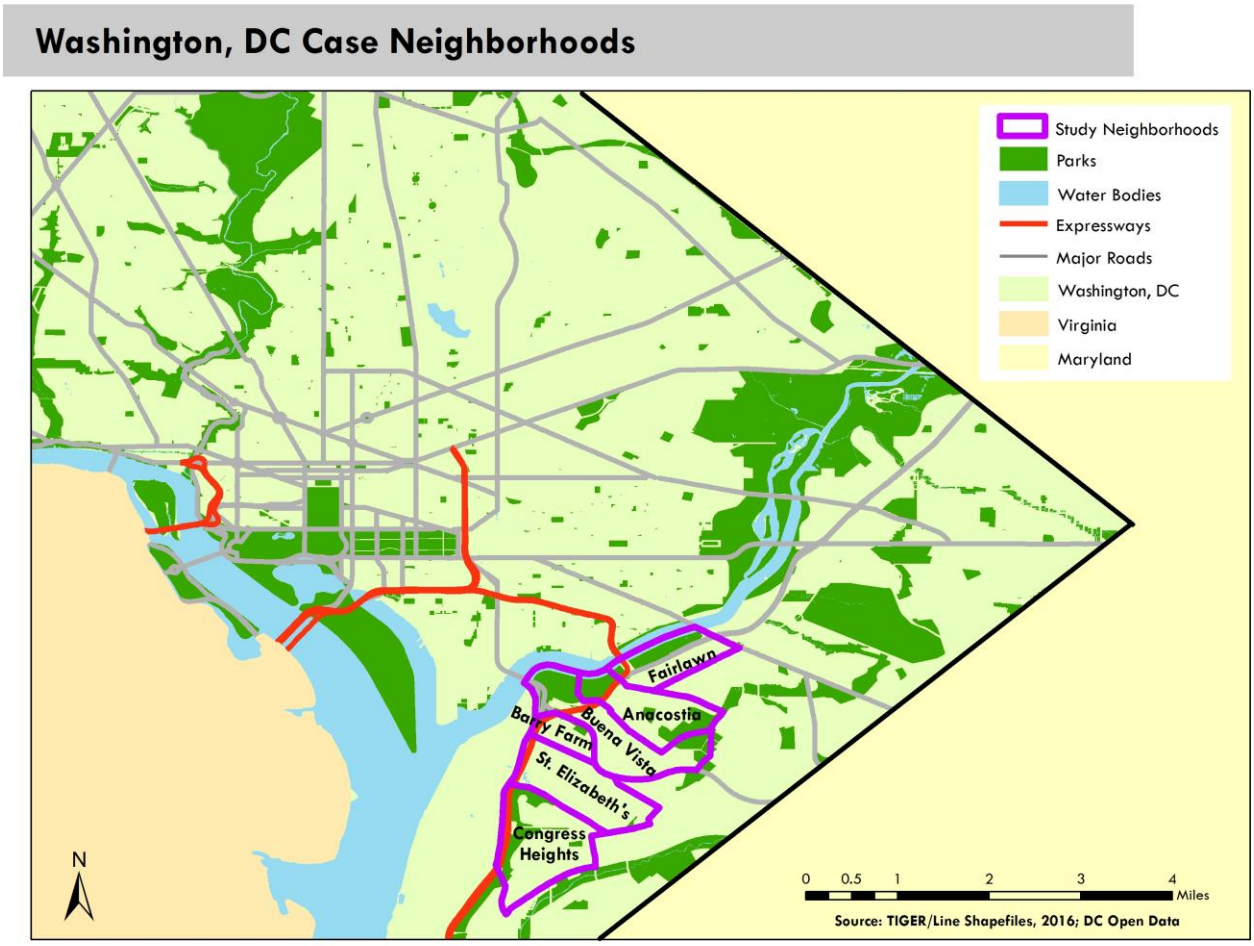


Figure 13: Washington, DC Case Neighborhoods including Anacostia, Fairlawn, Buena Vista, Barry Farm, Congress Heights, and St. Elizabeth's

The following sections discuss the case selection criteria, including green infrastructure investment and gentrification concerns; variation in political context; housing market pressure; and racial and income-based residential segregation, as they relate to the case cities and subcases.

4.4.1 Green Infrastructure Investment and Gentrification Concerns

The city of Atlanta has recently engaged in a multitude of green infrastructure planning efforts, including the Atlanta Beltline; cleanup of the Proctor Creek watershed;

the Proctor Creek Greenway; green streets and parks designed to address flooding issues on the city's west side; and a focus on supporting urban agriculture around the city. However, increasing investment in the city center combined with an overall trend of movement back to the city has led to rapid increases in housing costs in areas that have historically experienced disinvestment (Immergluck, 2016).

In particular, the Atlanta Beltline, a 22-mile multi-use trail being developed along a former rail corridor, has spurred a large amount of investment in previously low-market areas of the city surrounding the new trail. Housing affordability, displacement, and community benefits have been major topics of concern, as the announcement and development of the eastern portion of the trail (which began construction in 2010) has been associated with increases in property and housing values. Rents and home values surrounding the western portion of the trail, currently under development, had already begun to rise in 2016 (Immergluck, 2016).

In addition to the Atlanta Beltline, several smaller green infrastructure projects are in the process of being planned and developed on the city's Westside (see Figure 14). Much of the western portion of the city falls within the Proctor Creek watershed, which has historically experienced flooding issues. Several recent and upcoming green infrastructure projects aim to address flooding concerns and provide amenities to spur investment in Westside neighborhoods. Projects include Cook Park and Boone Park West, stormwater parks planned for the Vine City and English Avenue neighborhoods (Samuel, 2017, Lee, 2017); Boone Boulevard green streets, including stormwater management, and pedestrian and bicycle improvements (U.S. Environmental Protection Agency, Region 4 and Office of Research and Development, 2013); the Proctor Creek

Greenway, which includes 50 acres of linear park and 400 acres of green space and a bike and pedestrian trail (Miller, 2017); and the cleanup of the Proctor Creek Watershed (United States Environmental Protection Agency, n.d).

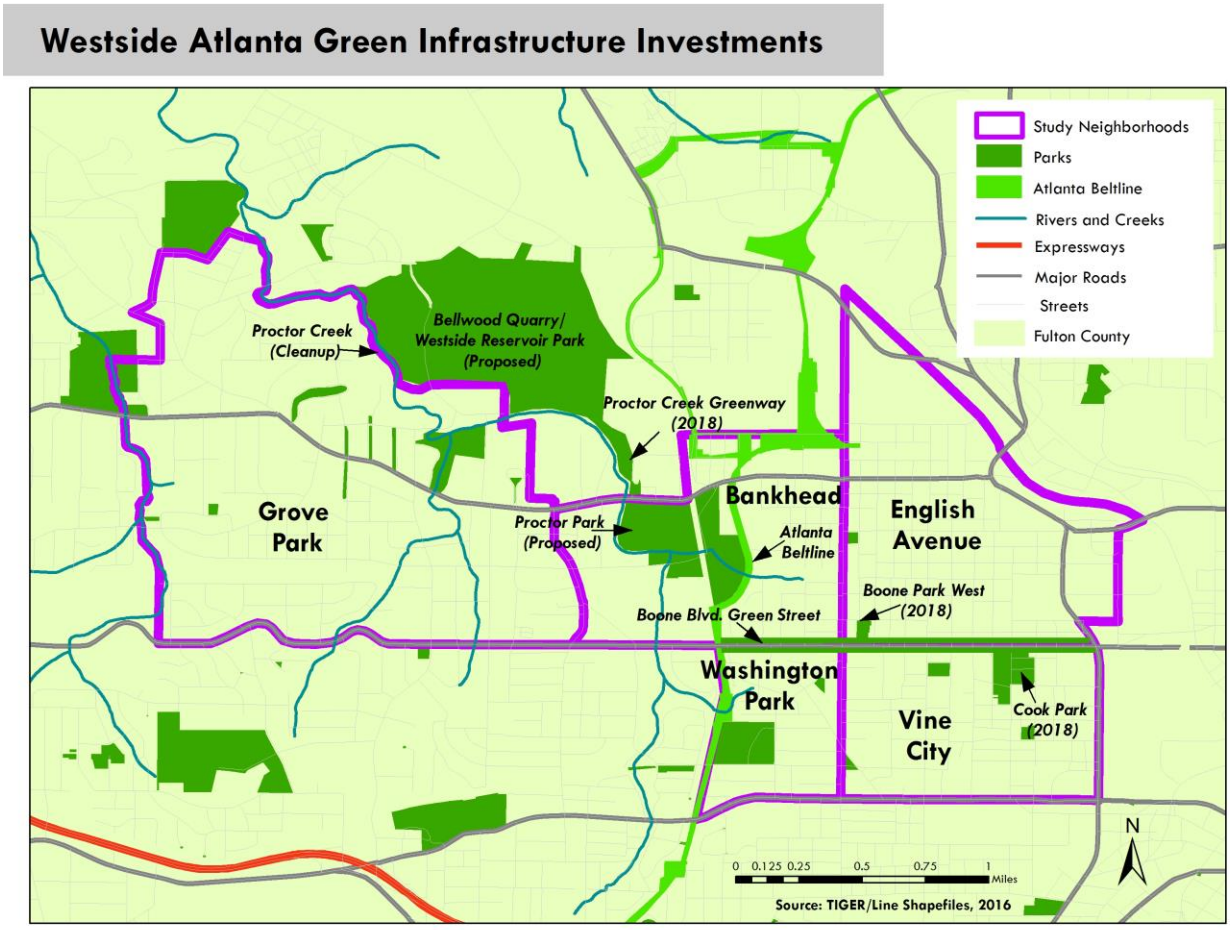


Figure 14: Westside Atlanta Green Infrastructure Investments

The Washington, D.C. case neighborhoods have also engaged in a multitude of green infrastructure planning projects in recent years. In particular, plans for the development of the 11th Street Bridge Park, an elevated recreation space on the piers of the old 11th Street Bridge-- have created concerns for continued housing affordability in Anacostia and its surrounding neighborhoods on the eastern side of the Anacostia River. The park, slated to open in 2019, will connect higher-income, fast-growing areas of DC,

such as Capitol Hill and the Navy Yard to the lower-income Anacostia area east of the river. The project's goals include supporting improving health disparities, supporting healthy communities with recreation, connecting the community to the river and to the Capitol Hill/ Navy Yard area, and serving as an anchor for inclusive economic activity (11th Street Bridge Park, n.d.).

While the park planning process has focused on providing benefits to surrounding neighborhoods, and on equitable development in particular, neighborhood residents have voiced concerns surrounding housing affordability, gentrification, and displacement. Home prices have risen in recent years in Anacostia and its surrounding neighborhoods, and a significant portion of residents are considered rent burdened (Urban Institute, 2016). The park planning process focused on equitable development as a primary goal, and the park's Equitable Development Task Force collaborated with community stakeholders to produce the 11th Street Bridge Equitable Development Plan (Building Bridges Across the River, 2015).

In addition to the 11th Street Bridge Park, several other green infrastructure projects are in the process of being planned or developed in the neighborhoods east of the Anacostia River. Recent and upcoming green infrastructure projects include the Anacostia Riverfront Trail; the St. Elizabeth's- Congress Heights EcoDistrict; the redevelopment of Poplar Point as a waterfront park; and plans for the restoration of the Anacostia watershed (National Parks Service, 2017, D.C. Office of Planning, n.d., see Figure 15). Similar to the Atlanta case, while these projects address environmental justice threats, such as flooding and water quality, and provide environmental amenities, such as recreation and transportation opportunities, they have also prompted concerns in

surrounding neighborhoods surrounding housing affordability, gentrification, and displacement of residents due to increasing housing costs.

Figure 15: East of the River Washington, DC Green Infrastructure Investments

Cases were also selected to provide variation in project scale, form, and context. In Atlanta, the Atlanta Beltline provides an example of a large-scale city-wide project, while other green infrastructure planning efforts on the Westside of Atlanta provide examples of small- and medium-scale neighborhood projects. In Washington, D.C., the 11th Street Bridge Park provides an example of a medium to large-scale inter-neighborhood project,

while other green infrastructure planning efforts in the case neighborhoods provide examples of small- and medium-scale projects.

4.4.2 Housing Market Pressure

The cases were also selected for their similarities in other areas of concern. Both cases and subcases provide examples of neighborhoods experiencing heightened market pressure related in part to large investments in green infrastructure, and in part to increases in market pressure in the case cities in general.

The neighborhoods on the Westside of Atlanta have experienced increases in housing costs and property values with investments in new amenities such as the Atlanta Beltline (Immergluck, 2017), as well as increasing market pressure in the city overall. While the green infrastructure projects described above are designed to address environmental justice threats, such as flooding and water quality, and provide environmental amenities, such as recreation and transportation opportunities, they have also prompted concerns in surrounding neighborhoods surrounding housing affordability, gentrification, and displacement of residents due to increasing housing costs (see, e.g., Bandlamudi, 2017, Samuel, n.d.).

Median rents have increased or remained constant in the census tracts that include the case neighborhoods of English Avenue, Vine City, Washington Park, Grove Park, and Bankhead, while median incomes are low in comparison to the city as a whole (see Table 2). A high percentage of residents can be considered ‘rent burdened,’ with median rents making up from 39 to 42 percent of household incomes.

Table 2: Housing Market Indicators, Atlanta Case Neighborhoods

Housing Market Indicators: Atlanta Case Neighborhoods							
	2010 Median Gross Rent	2016 Median Gross Rent	Percent Change, Median Gross Rent, 2010-2016	2010 Median Household Income	2016 Median Household Income	Percent Change, Median Household Income, 2010-2016	2016 Median Gross Rent as a Percentage of Household Income
Census Tract 23 (English Avenue-Bankhead)	$756	$764	1.1%	$20,350	$26,793	31.7%	42.5%
Census Tract 24 (Washington Park)	$801	$858	7.1%	$29,117	$30,000	3.0%	39.7%
Census Tract 25 (Vine City)	$819	$820	0.1%	$24,596	$23,767	-3.4%	39.3%
Census Tract 85 (Grove Park)	$835	$993	18.9%	$24,255	$28,556	17.7%	39.1%
Census Tract 118 (English Avenue)	$643	$843	31.1%	$20,638	$14,068	-31.8%	42.0%
Source: American Community Survey, 2006-2010 and 2012-2016 5-year estimates							

Property values surrounding new amenities such as the Beltline have continued to rise in recent years (Immergluck, 2009, Immergluck, 2017). Immergluck (2016) also notes that from January 2012 to July 2016, median rents for listings on Zillow increased in several neighborhoods surrounding the Beltline, including increases of 22% in English Avenue; 17% in Vine City and Bankhead, and 14% in Washington Park. By 2015, homes within ½ mile of the Atlanta Beltline were expected to increase 21.5 percentage points more in value than otherwise similar homes further away from the project (Immergluck and Balan, 2017).

The Washington, D.C. case neighborhoods have also witnessed increasing housing costs in recent years (Urban Institute, 2016), and planning for green infrastructure projects such as the 11th Street Bridge Park has brought about concerns for gentrification and displacement of existing residents. Similar to the Atlanta Westside neighborhoods, D.C.'s east of the river neighborhoods have experienced increases in median rents (see Table 3). While rents in the neighborhoods are low relative to those in the city as a whole, median incomes are also relatively low, and a high proportion of

renters spend more than 35 percent of income on rent. All three tracts that make up the two neighborhoods have experienced declines in median household income over the 2010-2015 time period.

Table 3: Housing Market Indicators, Washington D.C. Neighborhoods

Housing Market Indicators: Washington, D.C. Case Neighborhoods

	2010 Median Gross Rent	2016 Median Gross Rent	Change, Median Gross Rent, 2010-2016	2010 Median Household Income	2016 Median Household Income	Percent Change, Median Household Income, 2010-2016	2016 Median Gross Rent as Percentage of Household Income
Census Tracts 74.01 (Barry Farm/ Buena Vista)	$384	$448	16.7%	$19,238	$14,692	-23.6%	31.5%
Census Tract 74.06 (Buena Vista)	$879	$1,326	50.9%	$27,838	$30,000	7.8%	39.0%
Census Tract 74.07 (Buena Vista)	$886	$1,023	15.5%	$36,453	$38,138	4.6%	50.0%
Census Tract 75.03 (Anacostia)	$874	$1,065	21.9%	$31,551	$29,476	-6.6%	50.0%
Census Tract 75.04 (Anacostia)	$709	$889	25.4%	$20,625	$18,618	-9.7%	47.9%
Census Tract 76.01 (Fairlawn)	$779	$898	15.3%	$37,687	$34,107	-9.5%	40.9%
Census Tract 98.03 (Congress	$884	$932	5.4%	$30,625	$20,208	-34.0%	39.1%
Census Tract 98.04 (Congress	$841	$1,044	24.1%	$46,554	$36,405	-21.8%	40.6%
Census Tract 104 (St. Elizabeth's)	$734	$931	26.8%	$33,500	$38,750	15.7%	31.1%

Source: American Community Survey, 2006-2010 and 2012-2016 5-year estimates

In this way, the case neighborhoods in the two cities are similar in that they represent lower-market areas of relatively higher-market cities that are seeing increasing levels of investments and increases in rents and housing costs, and that also have a high proportion of cost-burdened residents relative to their cities. Investments in green infrastructure in the neighborhoods and increasing market pressure in the larger cities have been factors leading to increasing rents and housing costs for neighborhood residents, who tend to have lower incomes relative to the residents of the cities as a whole (see Tables 2-4).

Table 4: Housing Market Indicators, Fulton County, GA, and Washington, D.C.

Housing Market Indicators: Fulton County, GA and Washington, D.C.			
	2016 Median Gross Rent	2016 Median Income	2016 Median Gross Rent as Percentage of Household Income
Atlanta, GA	$998	$49,398	30.7%
Washington, D.C.	$1,362	$72,935	29.4%
Source: American Community Survey, 2012-2016 5-year estimates			

4.4.3 Racial and Income-Based Residential Segregation

Finally, the cases provide similar contexts with regard to dynamics of racial and income-based residential segregation at the neighborhood level (see Table 5). The populations of south and west Atlanta and eastern Washington, DC, are predominantly lower-income and Black or African American, while those of north and east Atlanta and western Washington, DC are predominantly upper-income and white. The case study neighborhoods have much higher proportions of African American residents than Washington, D.C. and Fulton County, Georgia as a whole do, with up to 99.5 percent of residents identifying as black or African American, compared with 44.1 percent of residents in Fulton County and 48.4 percent of residents in Washington, D.C. (see Table 5). Median household incomes in the case study neighborhoods are also much lower than their larger city and county areas.

Table 5: City/ County and Neighborhood Race and Income Indicators

City/County and Neighborhood Race and Income		
	2016 Percent Black or African American	2016 Median Household Income
Atlanta, GA	**52.4%**	**$49,398**
Census Tract 23 (English Avenue- Bankhead)	92.9%	$26,793
Census Tract 24 (Washington Park)	94.7%	$30,000
Census Tract 25 (Vine City)	91.7%	$23,767
Census Tract 85 (Grove Park)	96.5%	$28,556
Census Tract 118 (English Avenue)	68.1%	$14,068
Washington, D.C.	**48.4%**	**$72,935**
Census Tracts 74.01 (Barry Farm/ Buena Vista)	99.5%	$14,692
Census Tract 74.06 (Buena Vista)	91.2%	$30,000
Census Tract 74.07 (Buena Vista)	96.4%	$38,138
Census Tract 75.03 (Anacostia)	94.8%	$29,476
Census Tract 75.04 (Anacostia)	99.2%	$18,618
Census Tracts 76.01 (Fairlawn)	92.0%	$34,107
Census Tract 98.03 (Congress Heights)	99.4%	$20,208
Census Tract 98.04 (Congress Heights)	86.9%	$36,405
Census Tract 104 (St. Elizabeth's)	92.2%	$38,750
Source: American Community Survey, 2012-2016 5-year estimates		

These dynamics of geographic segregation by race and income are of interest with regard to potential gentrification and displacement effects of green infrastructure investments, as investments in lower-income neighborhoods would be expected to have disparate racial impacts.

4.4.4 Variation in Political Context

The Atlanta case allows for the examination of the development and role of social capital surrounding issues of gentrification, housing affordability, displacement, and

community benefits in a less supportive political context, with less local autonomy, while the D.C. case allows for the examination of these dynamics in more supportive political context with more local autonomy. The cases and their broader political contexts will be discussed further in the following sections, which further describe the two cases.

The Atlanta case allows for the examination of these factors in the context of less local autonomy surrounding housing affordability concerns and fewer existing tools to address affordable housing concerns. At the state level, the Official Code of the State of Georgia includes a prohibition of rent control (O.C.G.A. §44-7-19) and restrictions on the use of impact fees in development, which would limit their use in affordable housing provision (O.C.G.A. §36-71). Factors such as these create a state-level legal environment in which local affordable housing policies, such as inclusionary zoning, could face challenges at the state level if implemented locally. At the local level, with the exception of a few recently-developed policies and programs, Atlanta has yet to put in place extensive policy addressing housing affordability concerns. In 2016, the city implemented a policy requiring developers receiving subsidies, incentives, or grants from an economic development authority to set aside 10 to 15 percent of units as affordable (Atlanta City Council, 2016); however, developers not receiving subsidies are not mandated to meet this requirement. In 2017, the city and the Westside Future Fund announced an Anti-Displacement Tax Fund program, to be sourced from philanthropic donations, which provides grants to homeowners in Westside neighborhoods to help prevent displacement due to rising property taxes (Atlanta City Council, 2017). The Atlanta Land Trust Collaborative was developed during the Atlanta Beltline planning process to support permanently affordable housing but has not been well funded.

Washington, D.C. has greater local autonomy with regard to affordable housing preservation and development, as the city doesn't have to deal with state-level regulations such as Georgia's ban on rent control and limitations on impact fees for new development. At the city level, several policies have been put in place to support affordable housing development and preservation. Some of the policies in place include an inclusionary zoning ordinance, which requires developers to devote 8 to 10 percent of floor area to affordable units in new projects of more than 10 units and in large rehabilitation projects; rent supplement and home purchase assistance programs; the Tenant Opportunity to Purchase Act, which guarantees tenants the right to come together to purchase a building before its landlord can offer it for sale; and a Housing Production Trust Fund, which provides $100 million per year to affordable housing development and preservation.

In this way, the selection of these neighborhoods and case cities allows the study to examine neighborhoods with similar racial, socioeconomic, and housing market characteristics, but with varied political contexts surrounding the development of affordable housing policy.

CHAPTER 5. RESEARCH METHODS

The previous chapter detailed the study's research questions, hypotheses, and multiple case study research design. This chapter now presents the study's methodology. I first provide a discussion of embedded case study analysis and describe the study's approach for structuring and analyzing the cases. Next, in order to provide clarity around the concepts analyzed within the study, I operationalize the key concepts of social, intellectual, and political capital. I then detail data sources, management, and analysis. Finally, I discuss research ethics and internal validity, as well as research limitations and external validity, or transferability.

5.1 Embedded Case Study Analysis

Case construction and analysis includes 1) constructing case chronologies for the two cases (Atlanta and Washington, D.C.) and embedded cases; 2) analyzing the process outcomes of social capital development in the embedded cases; 3) analyzing the outcomes of social capital with regard to shaping of projects and policy; and 4) explaining the impacts of social capital and the case contexts on observed project and policy impacts.

For step 1, the construction of case chronologies, I provide a historical overview of the three cases to provide an understanding of the context and events relating to green infrastructure planning and social capital development as they occurred over time. In particular, I focus on aspects such the development of structural and cognitive social capital over time and associated development of intellectual and political capital

surrounding housing affordability, gentrification, and community benefits concerns associated with green infrastructure planning and development. The chronology events is supported by sources including interviews, newspaper articles, plans and press releases relating to each of the cases, quantitative data, and case accounts in academic articles. The construction of case chronologies supports further analysis in later research steps.

Step 2, the analysis of process outcomes of social capital development, examines the three cases with regard to the development of social capital in each case and the associated process and project-level outcomes. I examine cases with regard the stakeholders engaged in planning processes; knowledge-sharing and learning outcomes; and range of issues and interests discussed during planning process. Cases are compared with regard to governance, participants in planning processes and coalition building, knowledge sharing and learning, and range of issues and interests discussed in planning and coalition-building processes. This step addresses hypotheses 1 and 2.

Step 3, analyzing the program and policy-related outcomes of social capital, involves analysis of the case findings with regard to how social capital development surrounding projects has shaped the projects themselves as well as plans, policies, and programs at both the city and project levels. Cases are compared with regard to the impacts of social capital on the implementation of plans, policies, and programs addressing housing affordability, gentrification, displacement, and community benefits concerns. This step addresses hypotheses 3 and 4.

Step 4, explaining the impacts of social capital, explores the characteristics of social capital that led to project and policy-related impacts in the three cases. This step provides a foundation for insights regarding the potential and limitations for social capital

in supporting the development of plans, policies, and programs surrounding housing affordability, gentrification and displacement, and community benefits concerns, and for recommendations with regard to improving the effectiveness of social capital in supporting more equitable development around these areas of concern. Step 4 also compares the cases with regard to the impacts on social capital development of political context, addressing hypothesis 5.

Table 6 details the measures and approaches associated with the study's hypotheses.

Table 6: Hypotheses and Associated Measures and Approaches

Hypothesis	**Measures/ Approach**
Hypothesis 1: Green infrastructure increases social capital amongst neighborhood residents and stakeholders.	Examine development of structural social capital (network formation, coalition-building) and cognitive social capital (trust, reciprocity, norms) Process tracing supported by interviews, newspaper articles, and project plans and press releases
Hypothesis 2: The planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that lead to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.	Examine discussions of green infrastructure as a threat and opportunity within and outside planning processes; coalition building and information sharing around issues of housing affordability, gentrification, and community benefits concerns Process tracing supported by interviews, newspaper articles, and project plans and press releases
Hypothesis 3: Increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these planning processes.	Reasons for incorporation of housing affordability, gentrification, community benefits concerns into plans and planning processes Chronology of issue development and discussion inside and outside of official planning processes Plan, program, and policy impacts of social capital development Process outcomes of social capital development Process tracing supported by interviews, newspaper articles, and project plans and press releases
Hypothesis 4: Increases in social capital among residents and stakeholders surrounding issues of gentrification, displacement, and community benefits concerns lead government leaders to develop and implement policies and strategies to address these concerns.	Chronology of policy development around housing affordability, gentrification, and community benefits concerns Plan, program, and policy impacts of social capital development Process outcomes of social capital development

	Process tracing supported by interviews, newspaper articles, and project plans and press releases
Hypothesis 5: State and city-level political and policy support of housing affordability, gentrification and displacement, and community benefits concerns will strengthen neighborhood and project-level actors' capacities to develop and implement strategies in these areas.	Chronology of state and local policy development surrounding housing affordability, gentrification and displacement, and community benefits Tracing relationship of local plans, policies, and programs to state and local political context Process tracing supported by interviews, newspaper articles, and project plans and press releases

5.2 Operationalizing Key Concepts

Key concepts from the conceptual framework include social capital, intellectual capital (including knowledge sharing and mutual learning), and political capital (including coalition building and impacts on plans, policies, and programs). The following sections define and operationalize each of these concepts.

5.2.1 Social Capital

The development of social capital includes the building of relationships and trust, behavioral norms, and networks of communication (Putnam, 1995, Innes, Gruber, Neuman, and Thompson, 1994, Woolcock, 2004). Trust and norms refer to the cognitive aspects of social capital, while networks refer to its structural components (Uphoff, 2000). Trust may include trust in residents, neighborhood or non-profit organizations, or government agencies (Rohe, 2004). Norms include aspects such as reciprocity among actors (Coleman, 1988, Woolcock, 2004). Networks of communication refer to personal connections among stakeholders that support coordination among actors, including linkages among public and private sector actors and different levels of government

(Innes, Gruber, Neuman, and Thompson, 1994). Social capital may exist among stakeholders at the neighborhood or city level and may be strengthened through collaborative planning processes and coalition-building. I examine each case with regard to discussions of trust, behavioral norms, and networks of communication.

5.2.2 Intellectual Capital: Knowledge Sharing and Mutual Learning

Knowledge sharing and mutual learning occur when groups with different sets of knowledge come into contact, share information, and expand each other's perspectives (Lejano and Ingram, 2009). As stakeholders develop social capital, including trust, behavioral norms, and networks of communication, they are more likely to agree on issues, facts, and problem definitions, as well as gain an understanding of others' needs and interests, how actions of stakeholders affect other stakeholders, and how groups are part of an interconnected system (Innes, Gruber, Neuman, and Thompson, 1994). Stakeholders may also bring in technical experts and information to gain a mutual understanding of problems, define concepts, and agree on facts. In this way, social capital supports the building of intellectual capital through the sharing of knowledge among stakeholders and mutual learning from that knowledge. As stakeholders gain increased understanding of others' interests and needs, they may overcome distrust and further strengthen social capital in a self-reinforcing process (Innes, Gruber, Neuman, and Thompson, 1994).

I examine the cases with regard to the sharing of different sets of knowledge among stakeholder groups regarding problems, how stakeholder actions affect others, and

how groups interact in a common system; and learning based on information shared by stakeholders and technical evidence from stakeholders or outside experts.

5.2.3 Political Capital: Coalition Building and Impacts on Plans, Policies, and Programs

Coalition building occurs when stakeholders with a variety of interests come together to explore and address community concerns. Aspects of social networks developed through coalitions include factors such as network size, diversity of actors, network location, closeness of ties, and uses of networks, as well as horizontal (within neighborhood) and vertical (outside of neighborhood) forms of engagement (Rohe, 2004). Coalition-building may also consist of bonding, bridging, or linking forms of social capital, including horizontal linkages within and across neighborhoods, as well as vertical linkages to institutions and decision-makers (Rydin and Holman, 2004). I examine the cases with regard to whether green infrastructure has served as a catalyst for a variety of stakeholder groups coming together surrounding issues of housing affordability, gentrification, and community benefits concerns, whether during project planning processes or outside of these processes. I also examine cases with regard to the features of coalitions and networks, such as size and diversity of actors.

Alliances and coalitions have the potential to increase the individual and collective political power of group members (Innes, Gruber, Neuman, and Thompson, 1994). Agreements among coalition members may carry more political weight because of the inclusion of significant stakeholders and the use of consensus-building approaches, making them more likely to influence government-level plans, policies and programs.

Coalition members' organizations may also change their actions due to knowledge sharing and mutual learning during consensus-building processes (Innes, Gruber, Neuman, and Thompson, 1994). I examine the cases with regard to the political impact of coalition agreements and organizational change related to participation of organization members in consensus-building processes.

5.3 Data Sources and Management

Cases were analyzed with regard to the role of green infrastructure in supporting social capital and the role of social capital in green infrastructure's ability to contribute to low-income communities. I examined social capital and green infrastructure development in the cases over time, from early discussions of project development through implementation. A pilot study conducted from June to August 2017 included 13 in-depth individual interviews and document analysis of master plans and equitable development plans for the Atlanta Beltline and 11th Street Bridge Park projects. Additional data gathering took place after the proposal defense from March to September 2018.

Data-gathering strategies include in-depth individual interviews, participant observation, and document analysis. The study consists of in-depth individual interviews with participants involved in each of the selected cases, including planners, agency staff members, and community members, and analysis of the impacts of levels of green infrastructure and social capital on key factors noted in the conceptual framework. Observations were conducted during planning and community group meetings related to green infrastructure, gentrification, and/or equity-related impacts for low-income populations or communities of color. Document analysis of planning or community group

documents provided information about collaborative processes, including participants, processes, and outcomes, and allowed for further triangulation of data gathered in interviews and observations. Secondary sources such as newspaper articles were used to assist in providing a timeline for project planning and development.

5.3.1 Interviewing Sampling Strategy

In-depth interviews are particularly appropriate for the study in that they allow participants to provide in-depth descriptions of planning processes and outcomes in their own words. Interviews serve to triangulate findings regarding the impacts of green infrastructure and social capital, as well as provide information surrounding the case chronologies.

A key factor in interview selection for qualitative research is diversity in interviewees, with sampling strategy drawing on the academic literature, as well as personal knowledge and anecdotes from people with involvement in the topic of concern (King and Horrocks, 2010). With this in mind, the study includes interviews with 44 stakeholders involved in green infrastructure planning and implementation, including variation with regard to the groups of actors discussed in the literature review and their areas of interest in green infrastructure.

Interviewees include governance leaders in city and regional agencies; staff and leadership in community, grassroots, and advocacy organizations; residents engaged in green infrastructure planning and issues of gentrification; and private actors such as business or corporate leaders engaged in green infrastructure planning. Within these categories, I selected interviewees with interests in various aspects of green

infrastructure, such as environment and health qualities, economic development, or social equity concerns. These stakeholder groups and areas of interest were selected to obtain a variety of areas of involvement in green infrastructure planning and to understand the diverse connections between the variety of actors involved in issues of green infrastructure and equity. While some groups have interests in more than one of these areas, selecting interviewees with diverse interests in green infrastructure development provided a variety of perspectives on social capital development around various topics of concern, and on the impacts of social capital development on green infrastructure planning and implementation. For example, a leader of a government agency focused on economic development might provide a different perspective of coalition building, knowledge sharing, and mutual learning surrounding social equity concerns than a leader of a nonprofit organization focused on advancing social equity.

In addition to obtaining diversity in groups of actors and areas of interest, I also focused on agency of actors. In this way, I considered not only actors who are centrally involved in the cases, but also those who shape the choices and solutions available to other groups involved in the cases. These might include higher-level city, state, or federal actors or other groups or individuals with agency with regard to policy, resources, or social capital.

In selecting specific interviewees, I began with a preliminary list of actors from the categories identified in the literature review with varying interests and involvement in green infrastructure planning and/or issues of gentrification and displacement in the two cases. To form this initial list, I performed online searches of the green infrastructure projects in the case neighborhoods and listed the government agencies, nonprofit

organizations, community groups, and private sector actors involved in the projects. I also searched for organizations and agencies focused on issues of housing affordability and workforce development advocacy in the case cities. I listed agencies and organizations working on issues of sustainability and social equity in the cities more broadly. Using these preliminary lists of organizations, agencies, and community groups, I then searched for specific individuals to contact for interviews. Finally, I confirmed and added to these initial lists of individuals by talking with local experts involved in green infrastructure or housing affordability in the case cities. Additional interviewees were added based on input from initial interviews concerning other important actors in the study's areas of focus.

In order to determine when a sufficient number of participants had been interviewed, I used the criteria of sufficiency and saturation of information (Seidman, 2006). Evaluating the number of interviewees with regard to the sufficiency criterion meant ensuring that participants reflected the range of participants and sites within the population so that the sample reflects the experiences of those in the population outside of the sample. Within this dissertation's case studies, this meant ensuring the participation of a range of actors involved in green infrastructure planning, implementation, and/or advocacy, including public officials and actors from government agencies; nonprofit organizations; and neighborhood-level actors such as neighborhood organizations organizations, grassroots and advocacy groups, and neighborhood residents (see Table 7). It also meant ensuring that interviewees were involved with a range of green infrastructure projects within the case neighborhoods.

Table 7: Type and number of interviewees

Type of Actor	Atlanta	Washington, D.C.
Government Agency/ Public Official	4	8
Nonprofit Organization	11	6
Social/ Economic Nonprofit Organization	*3*	*5*
Environmental Nonprofit Organization	*8*	*1*
Grassroots/ Neighborhood Organization	11	4
Social/ Economic Grassroots/ Neighborhood Organization	*5*	*2*
Environmental Grassroots/ Neighborhood Organization	*6*	*2*
Total	**26**	**18**

The distribution of interviewees for the two cases also reflects the presence and levels of involvement of different categories of actors in green infrastructure and issues of equitable development in the case cities. For example, in Washington, D.C., government agencies more frequently led planning for green infrastructure projects, while in Atlanta, projects were more likely to be led by environmental nonprofit organizations. Similarly, the distribution of interviewees reflects Washington, D.C.'s stronger presence of housing-focused nonprofit organizations and Atlanta's stronger presence of environmentally-focused grassroots and neighborhood-focused organizations. While environmentally-focused nonprofit organizations worked in Washington, D.C.'s Ward 8 neighborhoods, grassroots and neighborhood organizations focused on environmental concerns had less of a presence in these neighborhoods, particularly in comparison to the network of grassroots environmental organizations active in Atlanta's Westside neighborhoods.

Next, evaluating the number of interviewees with regard to the saturation of information criteria means that the interviewer begins to hear the same information reported and is no longer learning anything new (Seidman, 2006). Within this dissertation's case studies, interviewees repeated responses surrounding key themes such as the environmental and economic impacts of green infrastructure, the role of green infrastructure in developing social capital, and the role of social capital in shaping green infrastructure projects and policy to the point that saturation was reached.

5.3.2 Interview Process

Interviews typically lasted between 45 and 75 minutes. They were conducted in person when possible, or by phone or Skype when an in-person meeting was not an option. Almost all of the interviews were recorded and transcribed, except in two cases in which interviewees indicated they were uncomfortable with interviews being recorded. I also took notes during interviews, including those that were not recorded for transcription. Transcripts and notes were coded with regard to impacts of green infrastructure and social capital, including proposed impacts described in the conceptual framework and research propositions. Quotes are attributed not to specific interviewees but rather to broad categories of participants, such as "leader of community advocacy organization" or "agency staff member."

Questions focused on the impacts of green infrastructure on social capital development and the impacts of social capital on green infrastructure and were based on the propositions included at the beginning of this chapter. The data collected from interviews supported process tracing on the impacts of green infrastructure on social

capital; the impacts of social capital development on green infrastructure planning and implementation; policy development surrounding housing affordability, gentrification, and community benefits concerns; and the role of political context and local autonomy. A sample interview protocol is included in the appendix.

5.3.3 Document Analysis.

The method for the study also included analysis of documents (Bowen, 2009). In particular, I searched for documents related to the green infrastructure projects in the case neighborhoods, including green infrastructure plan documents, reports, presentations, fact sheets, memorandums of agreement, and newspaper articles. These documents were available online or requested via email from people associated with the relevant agency, nonprofit organization, grassroots community organization, or green infrastructure project.

Document analysis provided additional evidence of proposed impacts of social capital and green infrastructure from the conceptual framework or allow for additional impacts to emerge from the data. The use of document analysis in addition to interview data provided additional sources and allow for triangulation of data. Document analysis supported process tracing of the impacts of green infrastructure on social capital; the impacts of social capital development on green infrastructure planning and implementation; policy development surrounding housing affordability, gentrification, and community benefits concerns; and the role of political context and local autonomy.

5.3.4 Participant Observation.

In addition to in-depth interviews, participant observation was used to provide data for the study. In-person observations were conducted for the Atlanta case only, as the researcher is local to Atlanta. Within the Atlanta case, I selected events for observation with the goal of supplementing data from the interviews with regard to understanding of the connections between actors and the impacts of green infrastructure and social capital. Observations were conducted at events such as presentations by government agencies on green infrastructure projects, housing- and green infrastructure-focused grassroots and community group meetings, and housing and green infrastructure-focused coalitions. These experiences allowed for observation of impacts of social capital, collaboration, and green infrastructure. Observations were tape recorded if permitted; otherwise, detailed note-taking on these processes provided data for the study.

5.4 Data Analysis

Data analysis processes allowed me to test the propositions included in the research questions section as well as examine potential emerging themes not included in the initial propositions. Further, it helped to further define important components in the conceptual framework and propositions from the perspective of actors involved, including social capital and equity.

Analysis included extensive coding using NVivo software and hand coding techniques, which allowed for sorting and comparison on data surrounding the roles of green infrastructure and social capital included in the propositions and conceptual framework.

I initially coded recorded interviews and notes from meetings with regard to categories and themes from the conceptual framework and using open coding to form additional categories and themes. This initial coding allowed for inclusion of codes for variables discussed in the study's conceptual model and hypotheses, as well as codes for new concepts that emerged from data.

For example, codes developed from the study's conceptual framework included the environmental and economic impacts of green infrastructure; the ways in which green infrastructure did or did not reinforce social capital; the ways in which social capital shaped green infrastructure projects; the ways in which social capital shaped advocacy and the development of policies and strategies around housing affordability; and how the political context of the case cities shaped the role of social capital.

In addition to using codes developed from the conceptual framework, I utilized open coding to allow for the development of codes for additional concepts that emerged from the data. Open coding refers to a process of identifying, describing, and categorizing phenomena from text or transcriptions (Strauss and Corbin, 1990). These processes allow for new concepts to emerge from the data outside of proposed concepts and hypotheses. Additional concepts that emerged from the data and were included as codes included definitions of equity and the responsibility of actors to address housing affordability and community benefits concerns.

In order to remain open to continuing to develop the conceptual framework model, the research used techniques derived from grounded theory, such as journaling and iterative open coding techniques, during the initial coding phase. Analytic memo

writing allowed the research to reflect on coding processes, code choices, the inquiry process, and emerging patterns, categories, and concepts in the data (Saldaña, 2015).

After initial coding, axial and selective coding allowed for identification of relationships and core variables. This second stage of coding involved working through initial code categories to form subcategories and relationships between code categories. I read through text coded in initial code categories and categorized it into subcategories and relationships. For example, subcategories for the code building of relationships and trust included the quality and flexibility of community engagement, community leadership and control, and the prioritization of concerns discussed by residents in planning processes.

5.5 Research Ethics and Internal Validity

The internal validity of the study is supported by analytical processes, triangulation of data sources and methods, oversight by a dissertation advisory committee comprised of experts in the research area, and oversight by the Georgia Tech Institutional Review Board (IRB).

First, the internal validity of the study is enhanced by high-quality analytical processes, including systematic, in-depth fieldwork and data analysis (Patton, 2002). With regard to fieldwork and data collection, the dissertation's research design, including the selection of cases that were similar in many aspects while differing with regard to political context, was developed with the goal of gathering data to test the study's hypotheses and answer its research questions. Further, the dissertation used research methods of interviewing, document analysis, and participant observation in order to

provide rich observational and interview data. The study also guarded against threats to internal validity with regard to data analysis. It supported internal validity in this way by utilizing open coding in addition to coding according to the study's conceptual model, thus allowing for alternative themes, divergent patterns, and rival explanations to emerge (Patton, 2002). It also used constant comparison to check the consistency and accuracy of code application and differences in the items that were coded (Patton, 2002).

Triangulation of data sources and methods also enhances the study's internal validity. The study triangulates data sources by including interviews with multiple sources involved in different aspects of each case. It triangulates with methods by using a variety of methods, including in-depth interviews, observation, and document analysis.

Further, oversight by dissertation advisory committee comprised of experts in the fields of city planning, anthropology, and public policy added to the internal validity and credibility of the study. The advisory committee reviewed the dissertation methodology, conceptual framework, and results. Dr. Michael Elliott, the dissertation committee chair, is an expert in environmental planning, collaborative planning, and conflict resolution, including involvement with these issues in the neighborhoods within Atlanta's Proctor Creek watershed. Dr. Bruce Stiftel, professor emeritus at Georgia Tech School of City and Regional Planning, is also an expert in environmental and collaborative planning and has done extensive research focused on environmental conflicts. Dr. Dan Immergluck, professor at Georgia State University's Urban Studies Institute, has done extensive research focused on the economic and equity-related impacts of large green infrastructure projects and the Atlanta Beltline in particular. Dr. Jennifer Hirsch is an applied cultural anthropologist and director of Georgia Tech's Center for Serve-Learn Sustain who

specializes in issues of equity in the sustainable built environment, grassroots sustainability innovation, and cross-cultural perspectives of sustainability. Dr. Robert Kirkman is a professor in Georgia Tech's School of Public Policy and specializes in environmental ethics and the values in play in decisions about the built environment.

To further support internal validity and attention to ethical issues, oversight by the Georgia Tech IRB provided ethical and methodological oversight. The IRB reviewed the study's research design and methods, human subjects interaction, recruitment email and phone scripts, data management procedures, and informed consent procedures (waiver of documentation of consent).

The research took additional to safeguard the interests of interviewees. Interviewees were notified that participation in interviews was completely voluntary and were asked to provide verbal consent for their participation. Quotes from interviews were not attributed to particular interviewees but rather to classes of interviewees (i.e., neighborhood resident, leader of community organization, government agency staff member). Similarly, quotes from public meeting transcripts were not attributed to individuals.

5.6 Research Limitations and External Validity/ Transferability

The external validity, or transferability, of the research is enhanced by the inclusion of cases with a variety of green infrastructure projects in terms of scale and form and varying political contexts in the case cities. In this way, the impacts of green infrastructure and social capital can be understood in a wider variety of project settings and political contexts. However, some aspects of the cases are not found in all cities and

may limit the ability to transfer the findings. Aspects which are significant in these cases are the large number of green infrastructure projects being planned and developed in the case neighborhoods; the large number of actors engaging in green infrastructure planning, advocacy, and implementation; high levels of segregation by race and income in the case neighborhoods; and increasing market pressure in previously low-market areas surrounding new investments in green infrastructure. Another factor is political support for green infrastructure and collaboration during the current time period, which could vary depending on the time period under consideration (e.g., the Trump administration's lack of support at the federal level through the EPA).

CHAPTER 6. ATLANTA AND WASHINGTON, D.C. CASE OVERVIEWS

As described in the chapter on research questions, hypotheses, and research design, the dissertation uses a multiple case study approach, focusing on the cities of Atlanta and Washington, D.C. Within the case cities, I examine sets of neighborhoods—in Atlanta, the neighborhoods of Vine City, English Avenue, Washington Park, Grove Park, and Bankhead, and in D.C., the neighborhoods of Anacostia, Fairlawn, Buena Vista, Barry Farm, Congress Heights, St. Elizabeth's.

The case cities and neighborhoods were selected for their similarities with regard to active engagement in green infrastructure planning, racial and income-based segregation, and increasing housing market pressure in previously low-market areas surrounding new green infrastructure investments. Both sets of case neighborhoods are highly segregated by race and income, with higher proportions of low-income and African American residents than the rest of their cities. Historically, these areas and their residents were harmed by discriminatory federal and municipal policies, construction of highways, and white flight, and the neighborhoods have experienced high levels of disinvestment until recent years. With the trend of the movement back to cities of a more affluent, white population, the neighborhoods have witnessed an influx of new sports facilities, residential and commercial development, and green infrastructure. Combined, these factors have created concerns for housing affordability, as marginalized communities that have experienced decades of disinvestment are now dealing with increasing housing costs associated with new amenities and population growth.

In addressing these concerns, the cities vary with regard to political context and level of local autonomy for engaging in the development of policies surrounding housing affordability, gentrification and displacement, and community benefits. Specifically, Washington D.C. has stronger affordable housing policies and greater local autonomy to enact further policies in the future, while Atlanta has weaker affordable housing policies and less local autonomy to enact policies in the future.

6.1 Atlanta

This case study focuses on the Atlanta neighborhoods of English Avenue, Vine City, Washington Park, Bankhead, and Grove Park. This section provides a background information on the case neighborhoods, including segregation by race and income, engagement in green infrastructure planning, housing market pressures, and political context.

6.1.1 Segregation by Race and Income

The Atlanta Westside neighborhoods are highly segregated with regard to race and income, with higher proportions of low-income and African-American residents than the rest of the city. Physical barriers, including Northside Drive, the Georgia World Congress Center, and the Mercedes Benz stadium, also serve as barriers between the Westside neighborhoods and the city's downtown.

The city and metro have been highly segregated since the early 20th century, with both federal policies and decision-making at the local level contributing to segregation and the marginalization of low-income communities and communities of color (Bayor, 1988,

Immergluck, 2009). Early segregation was due in large part to policies developed and enacted early- to mid-twentieth century, including discriminatory lending practices, construction of roads and highways, racial zoning, urban renewal, and white flight (Bayor, 1988, Kruse, 2005, Kruse, 2013).

Atlanta continues to have high levels of residential segregation by race, with the city's Black and African American population concentrated in the south and west, and white population more concentrated in the northern and eastern portions of the city (see Figure 16). In the case neighborhoods' Census tracts, more than 90 percent of residents identify as Black or African American alone, while in Atlanta as a whole this number is only 52.4% percent.

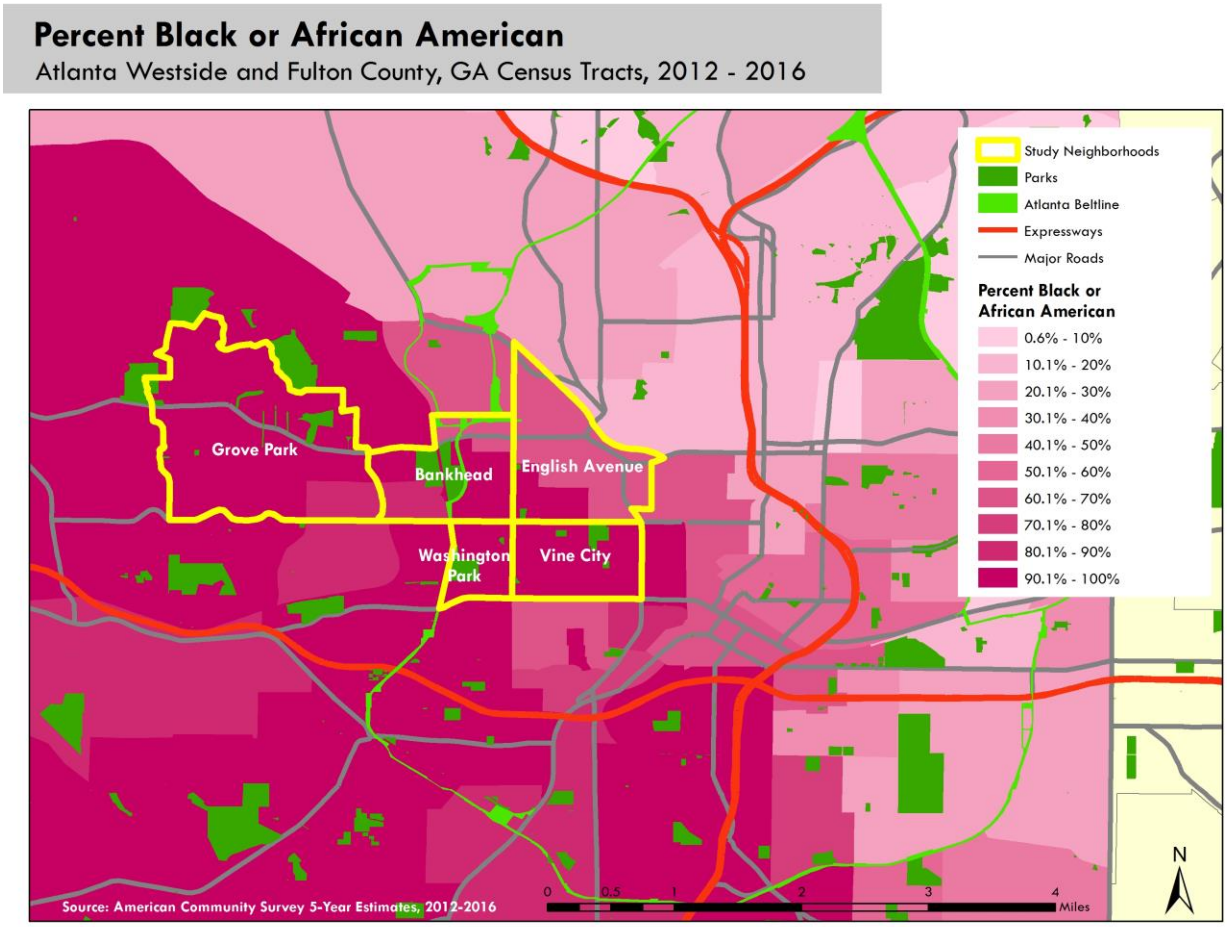


Figure 16: Percent Black or African American, Atlanta Westside and Fulton County, GA Census Tracts, 2012-2016

The city is also highly segregated by income. Neighborhoods in the southern and western portions of the city tend to have much lower incomes than the neighborhoods in the northern and eastern areas (see Figure 17). Median household incomes in the case neighborhoods are generally in the range of $15,000 to $35,000 per year, while the median household income for Fulton County as whole is about $59,000.

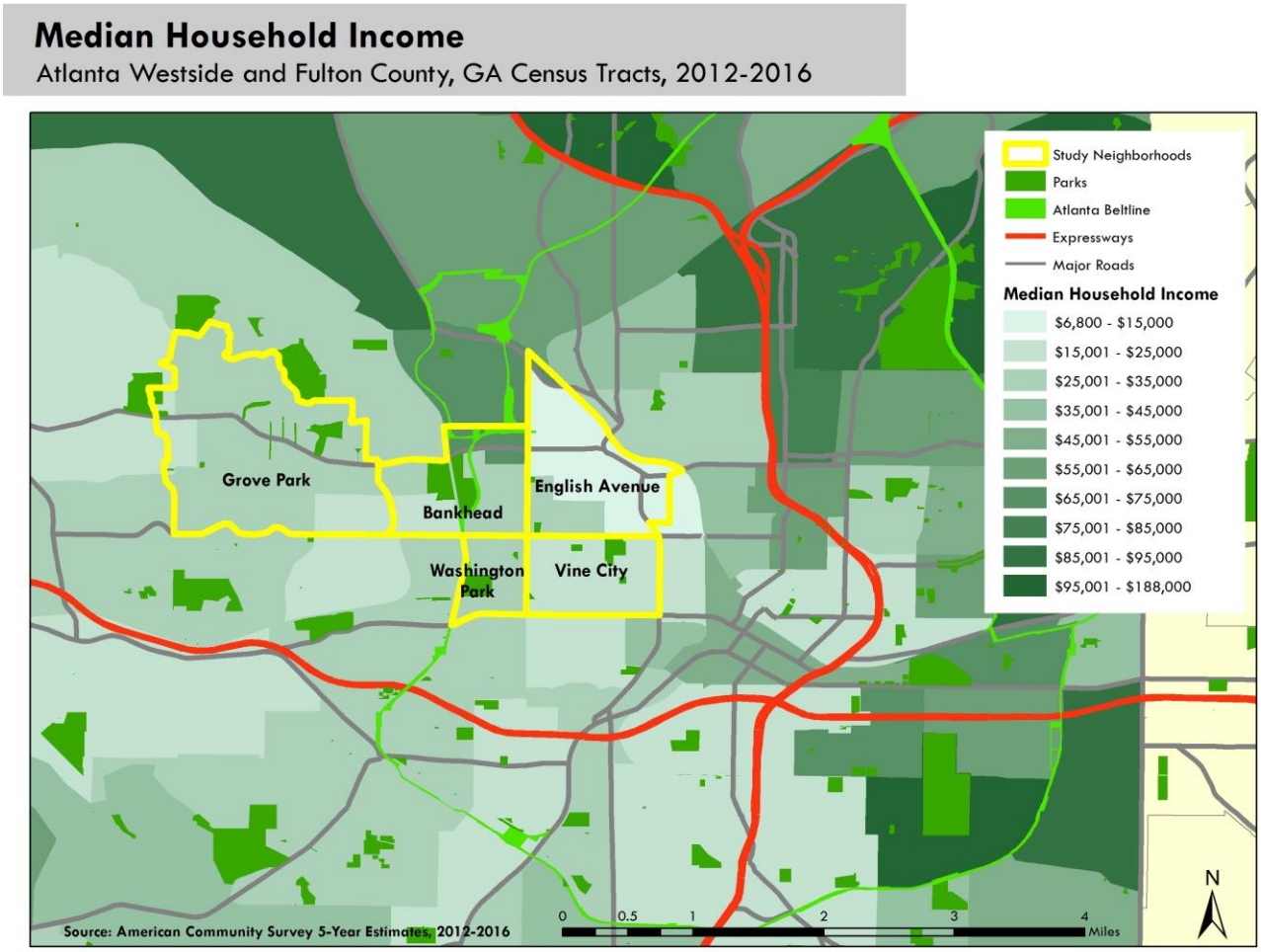


Figure 17: Median Household Income, Atlanta Westside and Fulton County, GA Census Tracts, 2012-2016

6.1.2 Engagement in Green Infrastructure Planning

Within this context of segregation by race and income, non-profit organizations and government agencies have engaged in planning and implementation for a variety of green infrastructure projects.

6.1.2.1 Early Parks and Green Infrastructure Planning

Although the concept of green infrastructure as a connected network of open space did not become popular until the late 20th century, the city began developing its green space network in the mid to late 19th century. In 1882, the donation of 100 acres on what now constitutes Grant Park created the city's first modern park (City of Atlanta Department of Parks and Recreation, n.d.). The city acquired 185 acres of land for Piedmont Park in 1904, and by 1910 had developed several neighborhood parks (City of Atlanta Department of Parks and Recreation, n.d.).

6.1.2.2 Involvement of Government Agencies in Green Infrastructure Planning and Implementation

Since 2000, government agencies at both the city and federal levels have also increased their involvement in green infrastructure. In 1998 and 1999, the city entered into consent decrees with the United States, the state of Georgia, and citizen plaintiffs, which set requirements for the city to improve its water quality. The city's Department of Watershed Management, which manages its wastewater and stormwater, was formed in 2002, and the wastewater component of the department's work has been controlled by the consent decrees (Department of Watershed Management, n.d.).

While management of the consent decrees has primarily relied upon grey infrastructure, the department has also been active in green infrastructure planning and implementation to support stormwater management goals. In 2012, city agencies engaged in a peer exchange with the city of Philadelphia around green infrastructure implementation. Soon after, the city formed a Green Infrastructure Task Force, comprised of a variety of local government agencies and non-profit organizations. In 2016, the task

force released the City of Atlanta Green Infrastructure Strategic Action Plan, a comprehensive plan for citywide green infrastructure implementation which includes strategies for policy, funding, and planning of green infrastructure; project implementation; partnership and outreach; and data tracking and technical analysis. The plan also highlights projects in the Westside neighborhoods identified in Park Pride's *Proctor Creek North Avenue Green Infrastructure Vision* that are in the process of being planned or implemented (City of Atlanta Department of Watershed Management, 2017). However, the department has lacked a consistent funding source such as a stormwater fee to implement green infrastructure and has relied on partnerships with outside funders and non-profit organizations.

In addition to implementing public green infrastructure, the City of Atlanta has required green infrastructure on private land through development regulations since the implementation of the city's Post-Development Stormwater Management Ordinance in 2013. The ordinance requires the use of green infrastructure to contain the first inch of rainfall onsite in order to reduce stormwater runoff.

Federal involvement with green infrastructure planning in the neighborhoods increased in 2013, when the Proctor Creek Watershed joined the Urban Waters Federal Partnership, a program led by the U.S. Environmental Protection agency that focuses on reconnecting distressed urban communities with their waterways through improved coordination among federal agencies. The partnership has focused on using green infrastructure as a primary mechanism for supporting water quality and quality of life improvements surrounding the creek.

Government agencies have also led planning efforts for individual green infrastructure projects and comprehensive parks and green infrastructure planning efforts. While the Atlanta Beltline began as a grassroots effort, the city eventually took on the project as a government-led initiative. Atlanta Beltline, Inc., formed by the city's development authority in 2006, now leads the planning and project management aspects of the project. Atlanta's Office of Resilience led planning for the Proctor Creek Greenway, which opened in 2018. The Atlanta Beltline and the Department of Watershed Management are leading planning efforts for the Westside Reservoir Park, which broke ground in 2018. The Department of Watershed Management has also played a key role in planning for stormwater management in Cook Park, Proctor Park, and Boone Boulevard green streets. At a larger scale, the City of Atlanta Department of Parks and Recreation began the planning process for the Envision: ATL Parks and Rec Comprehensive Plan, a vision plan for the city's park system, in 2018.

Government agencies have also played key roles in funding green infrastructure implementation. While the city's Department of Watershed Management has not had consistent funding for green infrastructure through a stormwater fee, the department has sought out alternative funding sources. In 2018, the Rockefeller Foundation selected the department to issue the first publicly-offered Environmental Impact Bonds--a 'pay-for-success' funding mechanism--to implement green infrastructure in the Proctor Creek Watershed. The city has proposed eight green infrastructure projects for funding for a total of $12.9 million in investments in green infrastructure in the neighborhoods of Vine City, English Avenue, Mozley Park, Grove Park and the Bankhead/Hollowell corridor (Neighborly, 2018).

6.1.2.3 Involvement of Nonprofit and Grassroots Organizations

While Atlanta's government agencies have prioritized green infrastructure in recent years, non-profit and grassroots groups have focused their work on green infrastructure and environmental justice for several decades. Beginning in the late 20th century, environmental justice concerns catalyzed the formation of environmental organizations that today focus their work on green infrastructure on the city's Westside. The West Atlanta Watershed Alliance (WAWA) formed in 1995 to address environmental justice threats in Westside neighborhoods, including leading a collaboration with stakeholders across the metro in efforts to close one of two CSO facilities in the Proctor Creek Watershed (Jelks, n.d.). The organization now serves as an advocate for a variety of watershed concerns, including green infrastructure implementation. Organizations also formed during this time that were specifically focused on the implementation of green infrastructure amenities. The non-profit organization Park Pride was formed in 1989 and was active during the decade in helping communities raise money for park improvements.

The concept of green infrastructure as a connected network of greenspace providing multiple benefits gained popularity in Atlanta by the early 2000s. The non-profit grassroots group Friends of the Beltline formed to support the implementation of the Atlanta Beltline, a 22-mile loop of trails, streetcar, and parks on a former rail corridor, a concept which was proposed in Ryan Gravel's 1999 graduate thesis (Atlanta Beltline, Inc., n.d.). In the early 2000s, Gravel and others conducted meetings around the city to build support for the project, and non-profit organizations and government agencies conducted studies surrounding its feasibility and design. These included a 2004 plan prepared for the Trust for Public Land, entitled *The BeltLine Emerald Necklace: Atlanta's New Public Realm,*

which proposed the addition of 1,401 acres of new parks to the 613 acres that already existed along the proposed trail (Alex Garvin & Associates, 2004). Advocates also connected the project to concerns for housing affordability and community benefits, and a goal for the development of 5,600 affordable units, was included in early planning efforts. However, many of the project's goals in this area have been slow to progress (Mariano, Conway, and Ondieki, 2017). While the project began as a community-driven effort, it is now led by a government entity, Atlanta Beltline, Inc.

The early to mid 2000s brought increasing involvement of park non-profit organizations in Atlanta's green infrastructure planning and implementation. In 2005, the Arthur M. Blank Foundation hired the non-profit The Conservation Fund to perform an open space assessment and provided the organization with a grant to establish a revolving fund to acquire open space for eventual transfer to city agencies. The organization's work in Atlanta during the 2000s focused primarily on property acquisition and fundraising, with the goal of increasing greenspace in the city. In 2005, Park Pride introduced its park visioning program, in which the organization provides support for communities in park planning.

In the 2010s, nonprofit park organizations, including Park Pride, the Conservation Fund, and the Trust for Public Land became increasingly involved in the planning and development of parks and green infrastructure. In 2010, Park Pride led a green infrastructure visioning effort for the Westside neighborhoods of English Avenue, Vine City, and the Atlanta University Center, called *Proctor Creek North Avenue Watershed Basin: A Green Infrastructure Vision*. The master plan developed from the planning process includes plans for eight catalyst sites for green infrastructure. The plan did not

provide funding for implementation of proposed green infrastructure projects but served as a blueprint for much of green infrastructure developed by non-profit organizations and city agencies in later years. In 2011, the Conservation Fund began its Parks with Purpose program in Atlanta with the goal of implementing some of the green infrastructure projects identified in Park Pride's vision plan. It has since implemented Lindsay Street Park and Kathryn Johnston Memorial Park in the English Avenue neighborhood, and an expansion of Vine City Park. The Trust for Public Land, which was active in developing the network of parks surrounding the Atlanta Beltline, led planning efforts for Cook Park in Vine City beginning in 2015.

Grassroots groups also developed coalitions around community involvement in green infrastructure planning during this time, focusing on both environmental and equity concerns. Focused on utilizing green infrastructure to achieve improvements in environmental quality, WAWA and the grassroots organizations Community Improvement Association, Inc. and Environmental Community Action (ECO-Action) collaborated to develop the Proctor Creek Stewardship Council, which received grant funding to begin work in 2013. ECO-Action and WAWA also partnered to develop the Atlanta Watershed Learning Network, a coalition focused on providing education and training to residents so that they can shape the planning and implementation of green infrastructure in their communities. Focused on addressing housing affordability concerns surrounding green infrastructure, the Housing Justice League formed in 2015 and since 2017 has focused its Beltline for All campaign on issues of housing affordability related to the Atlanta Beltline, including advocacy and protests, research, and recommendations for policy change. In addition to non-profit organizations and grassroots groups, civic groups such as the city's

Neighborhood Planning Units (NPUs), citizen advisory councils that make recommendations to the Mayor and City Council on planning matters, have also been involved in green infrastructure planning processes at a high level.

6.1.2.4 Recent Planning and Implementation of Green Infrastructure Projects in the Case Study Neighborhoods

Increased involvement of non-profit groups and government groups in green infrastructure planning led to increased implementation of green infrastructure projects in the city's Westside neighborhoods. From 2014 to 2018, partnerships between non-profit groups, government agencies, and corporate and philanthropic funders developed green infrastructure projects in the Vine City, English Avenue, Grove Park, Washington Park, and Bankhead neighborhoods. These projects are designed to address a variety of goals, from environmental goals such as stormwater management and environmental remediation, to economic development goals, such as neighbourhood revitalization, to social and health-related goals, such as providing recreation opportunities and improving public health. Recent green infrastructure planning efforts in the Westside neighborhoods include:

- The Atlanta Beltline Westside Trail, a portion of a 22-mile multi-use trail being developed along a former rail corridor (Washington Park/ Bankhead)
- Cook Park, a large stormwater park (Vine City/ English Avenue)
- Lindsey St. Park, Vine City Park, Kathryn Johnston Memorial Park, small neighborhood parks designed to address stormwater issues and provide recreation opportunities (Vine City/ English Avenue)

- Joseph E. Boone Blvd. green streets (Vine City/ English Avenue/ Bankhead/ Washington Park)
- Westside Reservoir Park at Bellwood Quarry, a 280-acre park that will include 2.4 billion gallons of water storage (Grove Park)
- Proctor Creek Greenway, a 7-mile trail that will connect 400 acres of greenspace to the Chattahoochee River (Bankhead/ Grove Park)
- Proctor Park (Bankhead)
- Proctor Creek watershed cleanup (all neighborhoods)

Figure 18 details the locations of these projects in and around the Atlanta case neighborhoods. These projects are discussed in greater depth in Appendix B.

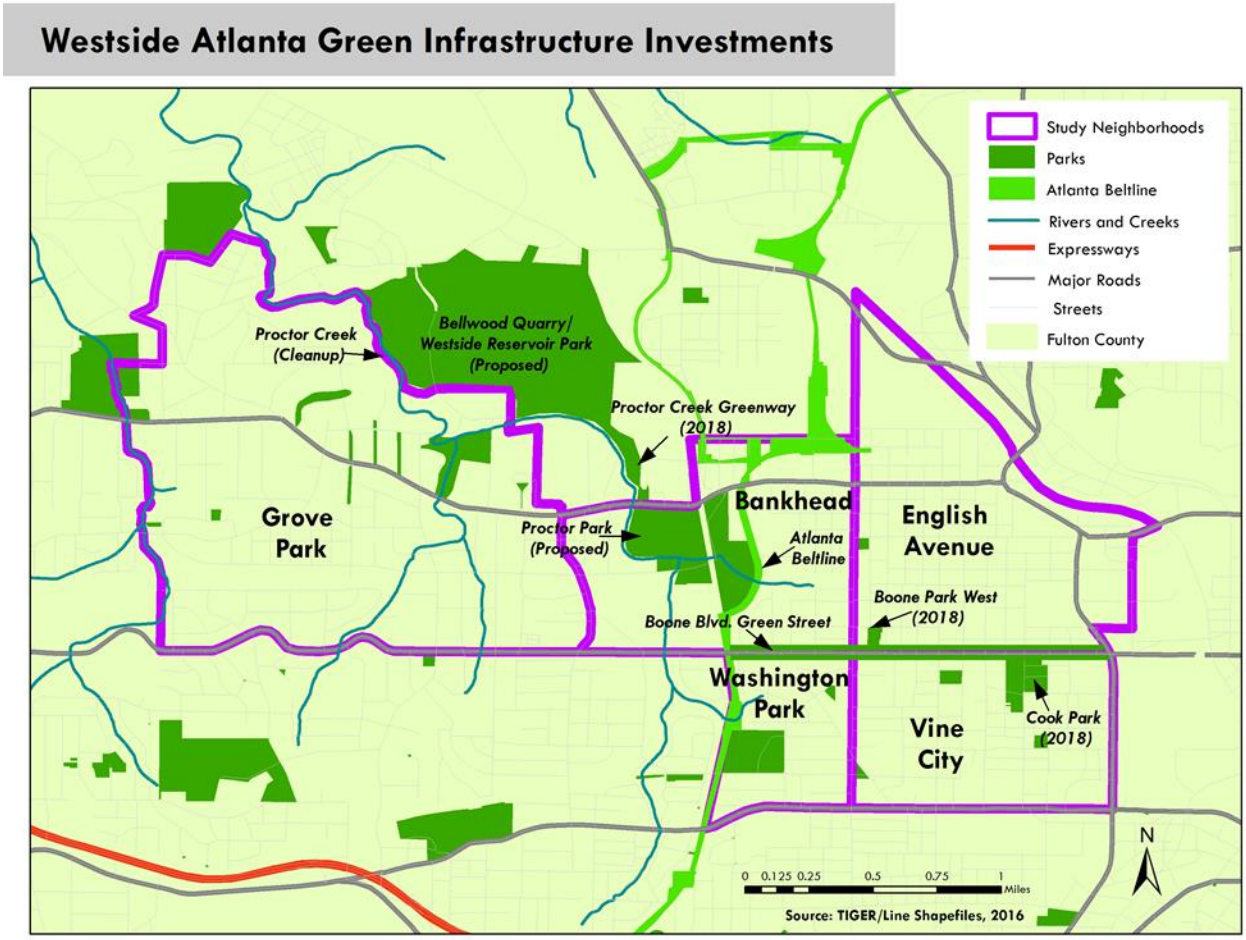


Figure 18: Westside Atlanta Green Infrastructure Investments

6.1.3 Housing Market Pressure Surrounding New Green Infrastructure Investments

In addition to environment and health concerns, economic development has also been a primary driver of green infrastructure investments in the Westside neighborhoods. As a result of new investments in amenities, combined with trends of population growth, the neighborhoods have experienced increasing housing market pressures in recent years. The City of Atlanta Green Infrastructure Strategic Action Plan (2017) describes drivers of green infrastructure development as including economic development and leveraging

greenway properties, in addition to environmental concerns such as flooding and climate change resilience (Figure 19).

Figure 19: Drivers of Green Infrastructure Implementation (City of Atlanta Department of Watershed Management, 2017)

Indeed, as described in the literature review for this dissertation, a variety of types of green infrastructure projects have been associated with increases in land and housing values. In Atlanta specifically, both the announcement and implementation of the Beltline has been associated with increase in housing prices and rents (Immergluck, 2009, Immergluck and Balan, 2017). Issues of gentrification and displacement and the need for jobs and workforce development were also prominent concerns for residents in many of the planning efforts for small to medium-scale green infrastructure projects in the Westside neighborhoods. Post-2010, concerns around gentrification and displacement associated with new amenities

became more prominent as housing prices and rents in many parts of the city continued to increase.

The case study neighborhoods have not experienced as extreme rent increases as other neighborhoods within the city of Atlanta in which the Beltline was implemented earlier; yet, rents have generally increased from the 2006-2010 period to the 2012-2016 time period (American Community Survey 5-Year Estimates of the two time periods, see Figure 20). Similarly, Immergluck and Mara (2016) noted that median rental listings on Zillow in the English Avenue, Vine City, Bankhead, and Washington Park neighborhoods increased between 14 and 22 percent during the 2012 to 2016 time period.

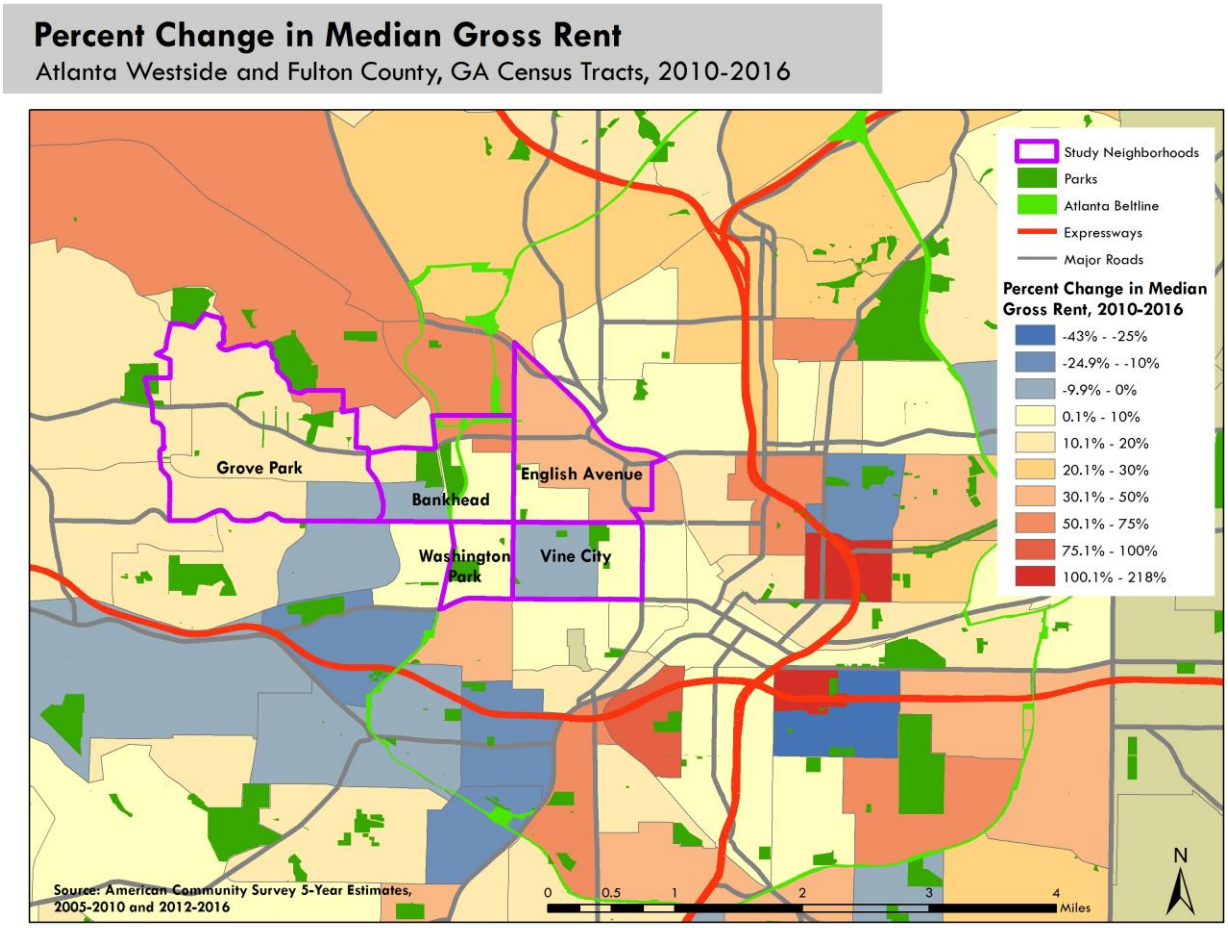


Figure 20: Percent Change in Median Gross Rent, Atlanta Westside and Fulton County, GA Census Tracts, 2010-2016

Yet, even relatively small rent increases in these neighborhoods have the potential to harm low-income renters, as a large proportion of renters in the case neighborhoods can be considered housing cost burdened (defined as households spending more than 30 percent of income on housing). As seen in Figure 21, the median gross rent as a percentage of household income for many Westside neighborhoods is between 39 and 50 percent, indicating that many residents in these areas are already experiencing financial challenges in meeting housing needs.

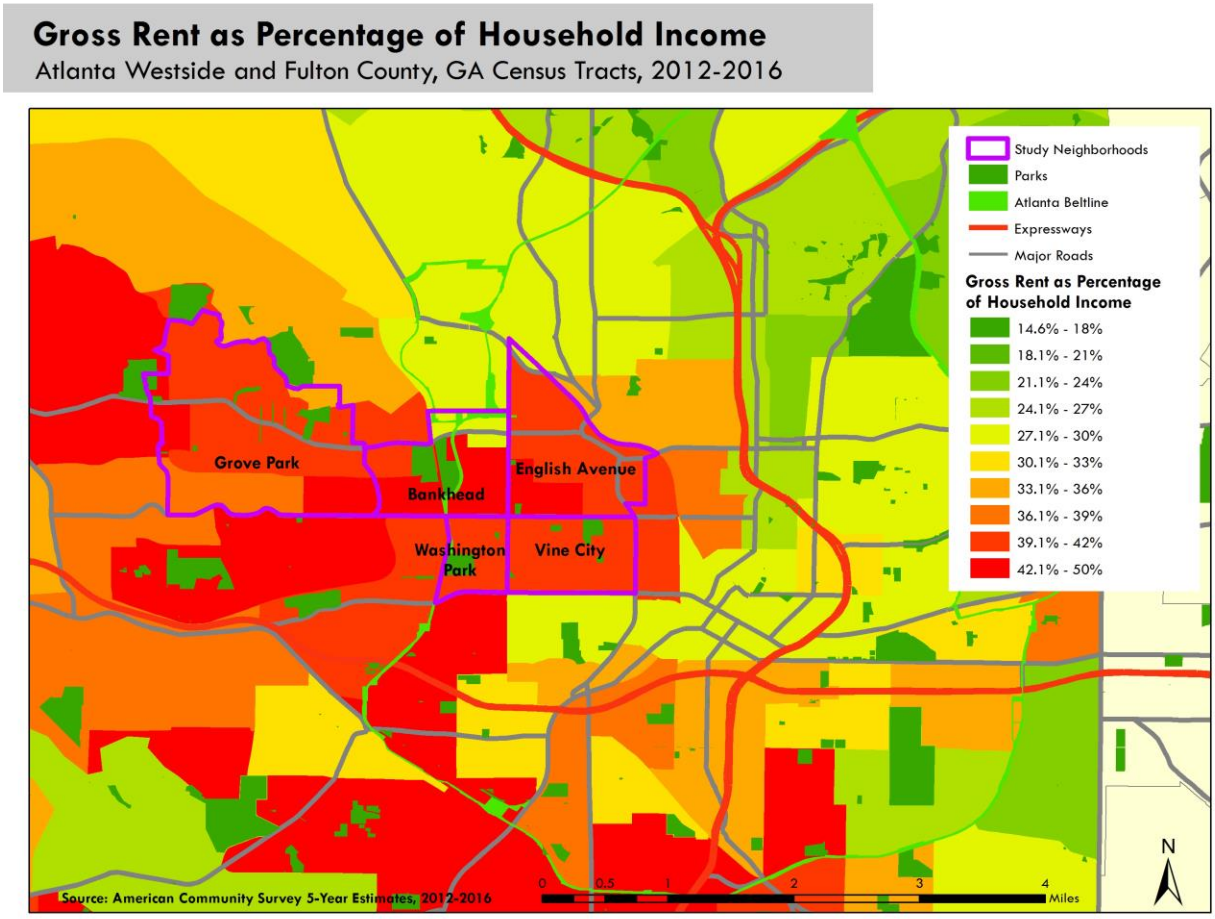


Figure 21: Gross Rent as Percentage of Household Income, Atlanta Westside and Fulton County, GA Census Tracts, 2012-2016

6.1.4 Political Context Surrounding Housing Affordability

The combination of segregation by race and income; engagement in green infrastructure planning and implementation in neighborhoods that have historically experienced disinvestment; and increasing housing market pressures create concerns surrounding whether current residents will benefit from new investments in green infrastructure. In considering this question, it is important to consider the role of the political contexts of the city of Atlanta and the state of Georgia in which groups are working. Compared to Washington, D.C., Atlanta presents a context of less local autonomy

surrounding housing affordability concerns and fewer existing tools to address these concerns.

At the state level, the Official Code of the State of Georgia includes a prohibition of rent control (O.C.G.A. §44-7-19) and restrictions on the use of impact fees in development, which would limit their use in affordable housing provision (O.C.G.A. §36-71). Factors such as these create a state-level legal environment in which local affordable housing policies, such as inclusionary zoning, could face challenges at the state level if implemented locally. At the local level, with the exception of a few recently-developed policies and programs, Atlanta has yet to put in place extensive policy addressing housing affordability concerns. In 2016, the city implemented a policy requiring developers receiving subsidies, incentives, or grants from an economic development authority to set aside 10 to 15 percent of units as affordable (Atlanta City Council, 2016); however, developers not receiving subsidies are not mandated to meet this requirement. In 2017, the city and the Westside Future Fund announced an Anti-Displacement Tax Fund program, to be sourced from philanthropic donations, which provides grants to homeowners in Westside neighborhoods to help prevent displacement due to rising property taxes (Atlanta City Council, 2017). The Atlanta Land Trust Collaborative was developed during the Atlanta Beltline planning process to support permanently affordable housing but has not been well funded.

6.2 Washington, D.C.

This case study focuses on the Washington, D.C. neighborhoods of Anacostia, Fairlawn, Barry Farm, Buena Vista, St. Elizabeth's and Congress Heights. This section

provides a background information on the case neighborhoods, including segregation by race and income, engagement in green infrastructure planning, housing market pressures, and political context.

6.2.1 Segregation by Race and Income

D.C.'s Ward 8 neighborhoods are highly segregated with regard to race and income, with higher proportions of low-income and African-American residents than the rest of the city. Racial segregation in Washington, D.C. has a long history that continues to shape residential patterns in the District, which remains highly segregated. Following the Civil War, Barry Farm served as a hub for free African Americans, at a time when many of the District's neighborhoods used racially restrictive covenants to prevent African Americans from settling in them (Prologue D.C., n.d., McFadden-Resper and Williams, 2005). Beginning in the 1950s with the integration of D.C. schools, D.C. and the Ward 8 neighborhoods suffered from white flight, urban renewal, and disinvestment, the effects of which continue to the present (McFadden-Resper and Williams, 2005, Hyra, 2017).

Since 2000, Washington, D.C. has experienced an influx of affluent, white residents. The city reached its peak population in 1950, and from then until 2000 continued to lose population (Hyra, 2015). During the 2000s, the city began to regain population, with a population increase of 5.1 percent during the 2000-2010 decade. The proportion of Black or African American residents also declined during this time period, from more than 70 percent in 1970 to 51 percent by 2010 (Hyra, 2015). By 2016, with increases in white and Hispanic populations, Black or African American residents made up just 48.4 percent of the city's population.

While Black or African American residents make up a shrinking proportion of residents in the city as a whole and west of the Anacostia River, more than 90 percent of residents living east of the river are Black or African American. As Figure 22 shows, the District's Black and African American population is concentrated in the south and east, while the white population is more concentrated in the northern and western portions of the city. The Anacostia River also serves as a barrier between these neighborhoods and the rest of the District.

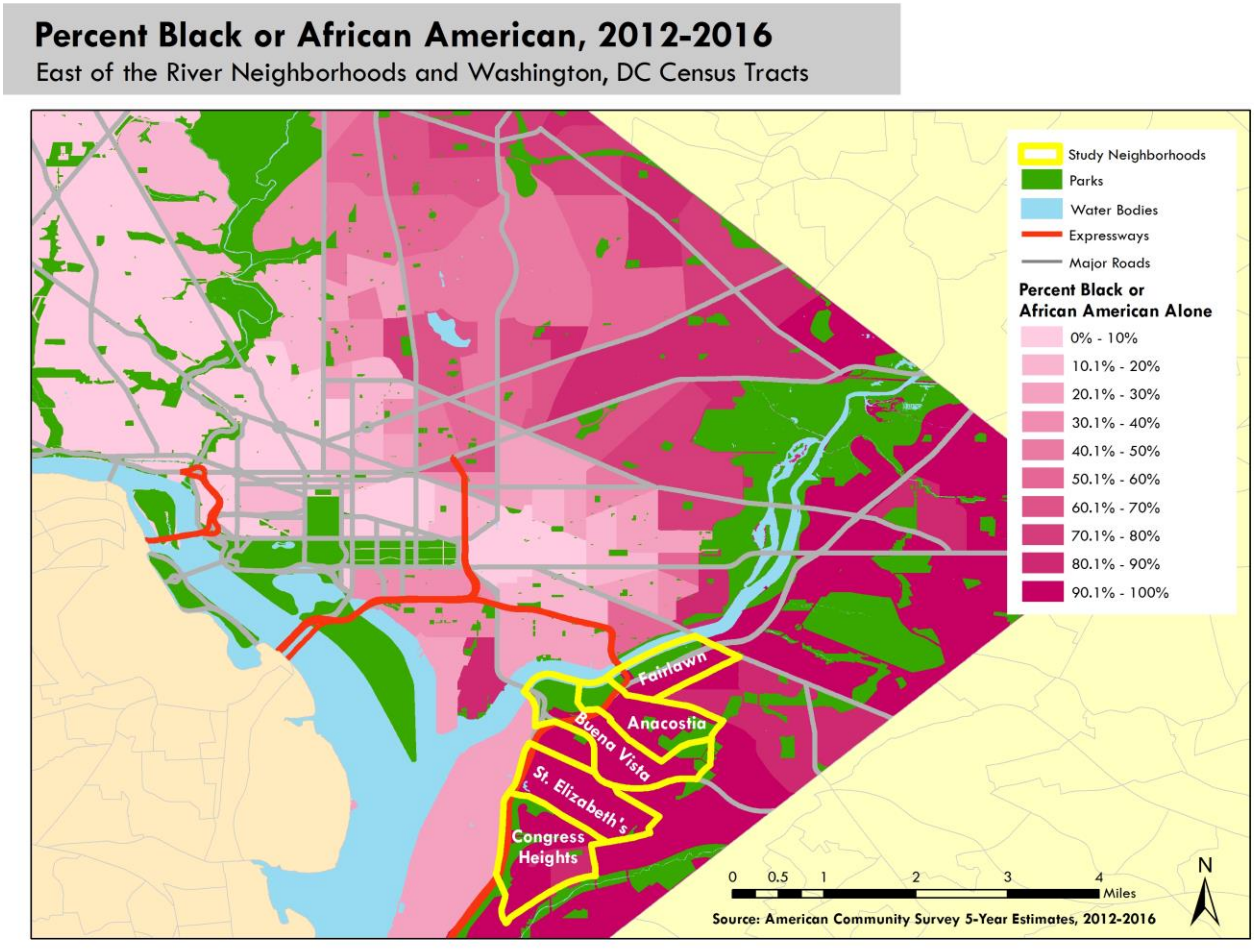


Figure 22: Percent Black or African American, East of the River Neighborhoods and Washington, DC Census Tracts, 2012-2016

Washington, D.C is also highly segregated by income. Neighborhoods in the southern and eastern portions of the city tend to have much lower incomes than the neighborhoods in the northern and western areas (see Figure 23). Median household incomes in the case neighborhoods are generally in the range of $15,000 to $35,000 per year, while the median income of the city as a whole is about $73,000. Poverty also remains high east of the river, while it is lower and has been declining in west of the river (Zippel, 2016).

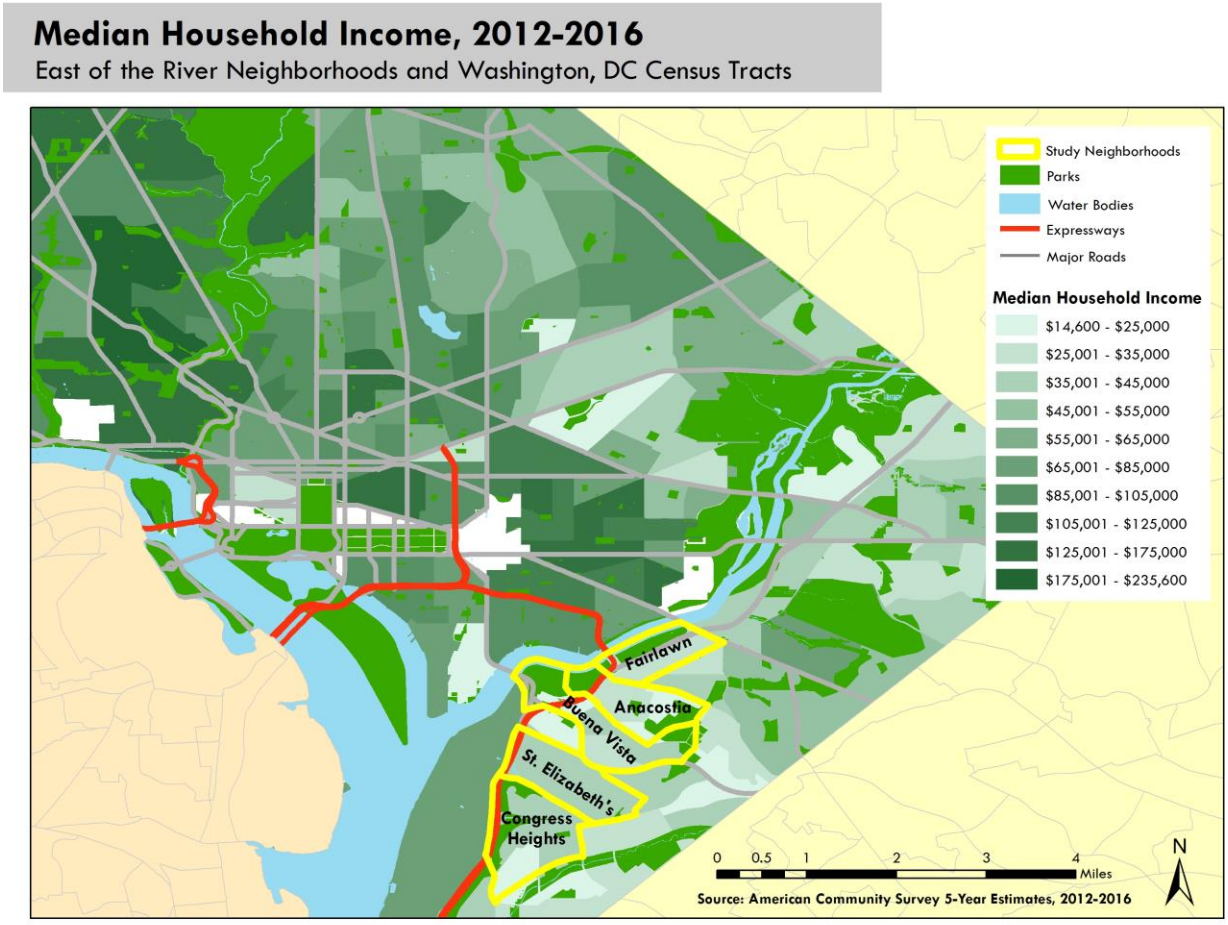


Figure 23: Median Household Income, East of the River Neighborhoods and Washington, DC Census Tracts, 2012-2016

6.2.2 Engagement in Green Infrastructure Planning

Washington, D.C.'s network of parks and green infrastructure have been a primary focus of planning efforts since the city's founding. Beginning in the late 1990s, District and federal government efforts have focused increasingly on the cleanup of the Anacostia River and the development of parks and trails along the river. More recent government efforts have aimed to integrate green infrastructure with broader goals of sustainability, resilience, and workforce development. Since 2000, government agencies and non-profit organizations have planned and/or implemented a variety of green infrastructure projects in the case study neighborhoods.

6.2.2.1 Early Parks and Green Infrastructure Planning

Planning for parks and green infrastructure in Washington, D.C. began in the late 1700s with Pierre L'Enfant's plan for the city, which envisioned parks and greenspace distributed throughout the street grid layout. By 1900, the city's park system included individual public parks that made up the national mall; Rock Creek Park; spaces reserved for the National Zoo and Naval Observatory; and East Potomac Park and the Tidal Basin, a 732-acre area that had been filled in over the tidal flats of the Potomac and Anacostia rivers (Peterson, 2006, National Capital Planning Commission, 2010).

In 1901, the Senate Park Commission, led by Frederick Law Olmsted, Jr. and Daniel Burnham, formed with the goal of restoring L'Enfant's vision for the mall area and to develop a comprehensive park system for the metro area. Inspired by the City Beautiful Movement and the 1893 World's Columbian Exposition in Chicago, the plan focused on the development of a connected system of parks, parkways, and boulevards, while staying

silent on social issues such as substandard housing and low wages, a narrow focus common to major planning efforts of the time (Gillette, 2006).

In 1924, Congress established the National Capital Park Commission, authorizing $1 million per year for the next 20 years for the acquisition of parkland in Washington, D.C. and surrounding areas in Virginia and Maryland (Gillette, 2006). The commission was expanded to include additional urban planning functions and became the National Capital Park and Planning Commission in 1926. While substantial resources were devoted to park development in Rock Creek Park and along the Potomac River, fewer resources were devoted to park development in lower-income, increasingly African-American neighborhoods surrounding the Anacostia River and to the restoration and transformation of the river (Davis, 2006). Several plans and policies were developed during the 20th century to support the development of parks and greenspaces and to implement the L'Enfant and Senate Park Commission plans, including funding from the Capper-Crampton Act in 1930, the *Comprehensive Plan of 1950*, and the 1961 *Year 2000 Policies Plan* (National Capital Planning Commission, 2010).

6.2.2.2 Involvement of Government Agencies

In addition to their role in early park planning efforts, Federal and District government agencies have played a prominent role in green infrastructure planning and the transformation of the Anacostia River beginning in the 1990s. Federal and District government agencies began focusing on improving the environmental quality of the Anacostia River in the 1980s, and further focused on developing the river as a waterfront attraction in the late 1990s and 2000s, including planning for parks, trails, and economic

development. Since 2010, planning efforts focused on sustainability and resilience have focused on green infrastructure as a means of achieving environmental, economic, and social goals.

Initial efforts at improving the environmental quality of the Anacostia River began in the 1980s. A 1984 agreement between the Distict of Columbia and Maryland recognized a need to restore the river, and the 1987 Anacostia Watershed Restoration Agreement added Montgomery and Prince George's counties into the agreement. Following the signing of the 1987 agreement, the Anacostia Watershed Restoration Committee was established to guide restoration progress (Anacostia Watershed Restoration Partnership, n.d.). The committee's 6-point action plan, developed in 1991, entailed goals to restore the river, including improved water quality and the protection of aquatic life, habitat, and ecological relationships; management of erosion, sediment and other sources of pollutants; maintenance the Anacostia River as a navigable waterway for commercial and recreational activities; expansion of opportunities for public recreational access and use of the Anacostia River and its tributaries; and enhancement of public interest in the Anacostia watershed and public participation in restoration activities (Anacostia Restoration Team and Metropolitan Washington Council of Governments, 1991). The work of the Anacostia Watershed Restoration Committee led to the formation of the Anacostia Watershed Restoration Partnership by the Metropolitan Washington Council of Governments in 2006 to oversee ongoing restoration efforts (Metropolitan Washington Council of Governments, 2006).

Plans developed in the 1990s and 2000s prioritized transforming the Anacostia River through improvements in environmental quality and using the waterfront and green

infrastructure as a tool for achieving goals for economic development, transportation, and other areas of concern. Citywide park planning efforts included a focus on the Anacostia River and the East of the River neighborhoods, while the Anacostia Waterfront Initiative focused its efforts specifically on the Anacostia River and its surrounding neighborhoods.

In 1997, the National Capital Planning Commission released an expansion of the L'Enfant and McMillan plans, *Extending the Legacy: Planning America's Capital for the 21st Century*, which called for an increased focus public access to the waterfronts of the Potomac and Anacostia rivers, as well as a new park network. Specifically, it proposed the transformation of the Anacostia waterfront "into a new ecological precinct, with the river and parks as the centerpieces and environmental stewardship as the theme" (National Capital Planning Commission, 1997, p. 20).

In 2000, a memorandum of understanding between 20 federal and district agencies launched the Anacostia Waterfront Initiative (AWI), with the goal of "transforming the Anacostia River from a forgotten and blighted river to a source of pride for the entire city and region" (Anacostia Waterfront Initiative & District Department of Transportation, 2007, p. 1-1). The AWI partnership developed the Anacostia Waterfront Framework Plan in 2003, with goals of improving environmental quality and supporting water-dependent activities on the river; improving access to the waterfront by rethinking transportation infrastructure; developing a connected system of waterfront parks, including the Anacostia Riverwalk Trail, a 20-mile trail on both sides of the Anacostia River; utilizing the waterfront to celebrate cultural heritage; and promoting sustainable economic development by reconnecting to the waterfront, including providing opportunities for development of mixed-use waterfront neighborhoods.

In 2008, the Department of Energy and Environment released *Anacostia 2032: Plan for a Fishable and Swimmable Anacostia River*, with goals of creating a visually presentable river, making the river swimmable and boatable, restoring the river's ability to support stable fish and wildlife populations, re-establishing a river that supports fish that are safe to eat (Department of Energy and Environment, 2008). In addition to recommendations focused on controlling combined sewer overflows, the plan recommends the use of green infrastructure, including the planting of trees, native vegetation, and riparian forest buffers, to create habitat for wildlife and reduce stormwater flows.

In 2010, the National Capital Planning Commission released *Capital Space: A Park System for the Nation's Capital,* which focused on the implementation of planning concepts such as greenways, trails, a green infrastructure network, and waterfront access and attractions (National Capital Planning Commission, 2010). The primary green infrastructure components of these plans were the Anacostia Riverwalk Trail, construction for which has been completed in the case study neighborhoods, and D.C. Water's green infrastructure program, projects for which are located in neighborhoods west of the Anacostia River but for which workforce development programs have focused on east of the river neighborhoods.

Legal efforts were a primary driver of the increased focus on improving the environmental quality of the Anacostia River over this time period. In 2000, the Anacostia Watershed Society and other community organizations filed a lawsuit against the District of Columbia to reduce water pollution resulting from combined sewer overflow. In 2005, D.C. Water and the District of Columbia entered into a consent decree through the Federal District Court requiring the District to reduce combined sewer overflows, provide flood

relief, and clean up the Chesapeake Bay (United States District Court for the District of Columbia, 2005). In 2015, D.C. Water and the District of Columbia modified the consent decree to include the use of green infrastructure and to support local hiring and workforce development goals (D.C. Water, 2015).

Since the consent decree, several efforts have focused specifically on addressing the combined sewer overflows and associated pollution of the Anacostia River. The District's water and sewer authority, DC Water, was formed in 1996 and has taken significant steps in this regard. Primary efforts include the long-term control plan and associated D.C. Clean Rivers Project, a large infrastructure program focused on reducing combined sewer overflows. In 2016, DC Water modified its 2005 consent decree with the U.S. Environmental Protection Agency, the U.S. Department of Justice, and the District of Columbia to utilize green infrastructure to achieve required reductions in combined sewer overflow volume instead of constructing an underground tunnel (DC Water, 2015). While the green infrastructure proposed in the plan was all designated for the neighborhoods west of the Anacostia River, which rely on a combined sewer system, the modification also included a Memorandum of Understanding between DC Water and the District of Columbia that included requirements for hiring of District residents and the development of a green infrastructure certification program (DC Water and the Government of the District of Columbia, 2015). In order to implement its plans for green infrastructure, DC Water launched the country's first Environmental Impact Bond for $25 million in investment in green infrastructure (DC Water, 2016).

Post-2010, green infrastructure has been a component of the District's planning efforts focused on sustainability and resilience and has been tied to goals such as workforce

development, racial equity, and climate action. In 2013, the city adopted the Sustainable DC Plan, a long-range plan for the city "to become the healthiest, greenest, and most livable city in the United States" (Sustainable DC, 2016, p. 2). The plan calls for increased use of green infrastructure in public right of ways and the development of incentives for the use of green infrastructure in landscaping and building design. While the plan primarily focuses on environmental concerns, it also includes goals surrounding workforce development, small business development, food, and education. An update to the plan, which is under development, includes recommendations for assessing impacts of planning efforts on racial equity and supporting community engagement from under-represented communities.

In 2017, Washington, D.C. joined the 100 Resilient Cities, a network of cities supported by the Rockefeller Foundation which is devoted to helping cities become more resilient to the physical, social, and economic challenges. In addition to other areas of focus, planning efforts will focus on climate action and the Anacostia River, asking how Washington, D.C. can "fully achieve the potential of the Anacostia River to generate improved health outcomes, biodiversity, economic activity, connectivity, cultural amenities, and recreation opportunities for District residents" (Resilient Washington, D.C., n.d.).

6.2.2.3 Involvement of Nonprofit and Grassroots Organizations

Nonprofit and grassroots organizations in Washington, D.C. have also taken on roles in leadership and advocacy surrounding green infrastructure. Several organizations have focused their work on the Anacostia River, while a few groups have focused their efforts on the Ward 8 neighborhoods in particular.

Several non-profit organizations have focused their work on advocacy and restoration of the Anacostia River. The Anacostia Waterfront Trust, the Anacostia Riverkeeper, and the Anacostia Watershed Society, citywide non-profit organizations, have focused their efforts on public policy and advocacy, restoration of the Anacostia River, and educational programs. In 2015, the Anacostia Waterfront Trust formed the Anacostia Park and Community Collaborative, a coalition of community-based and citywide nonprofit organizations focused on enhancing quality of life and environmental justice in communities near the Anacostia River.

In addition to citywide efforts, a few organizations have focused their work in green infrastructure on the Ward 8/ East of the River neighborhoods in particular. In particular, Building Bridges Across the River has served as the home organization for the 11th Street Bridge Park, a large green infrastructure a planned park to be located on the piers of the old 11th Street Bridge. The Anacostia Coordinating Council, a community organization focused on revitalizing Anacostia and adjacent neighborhoods, has supported the development of the Ward 8 Woods Park Stewards, which has focused on removing trash and invasive species, training community members in urban green space techniques, providing education on littering, and creating a small number of jobs for residents in green infrastructure.

6.2.2.4 Recent Planning and Implementation of Green Infrastructure Projects in the Case Study Neighborhoods

In addition to these broader plans and partnerships, the city's agencies and non-profit organizations have been actively engaged in planning and implementation of green

infrastructure projects in the Ward 8 neighborhoods in recent years. Recent green infrastructure planning efforts in the Westside neighborhoods include:

- The Anacostia Riverfront Trail, a planned 28-mile shared-use trail that runs along both sides of the Anacostia River, and waterfront planning efforts (Anacostia, Fairlawn, and Buena Vista)
- The 11th Street Bridge Park, a planned elevated recreation space on the piers of the old 11th Street Bridge (Anacostia and Fairlawn)
- The Sustainable Congress Heights EcoDistrict, a neighborhood-level sustainability planning effort (Congress Heights)
- The Gateway Pavilion at St. Elizabeth's East, an events space that includes a 1-acre park and a pavilion with a green roof (St. Elizabeth's)
- Poplar Point, a waterfront property which includes 130 acres of greenspace (Buena Vista)
- Restoration of the Anacostia River and watershed (all neighborhoods)

Figure 24 details the locations of these projects in and around the Atlanta case neighborhoods. These projects are discussed in greater depth in Appendix B.

Figure 24: East of the River Washington, D.C. Green Infrastructure Investments

6.2.3 Housing Market Pressure Surrounding New Green Infrastructure Investments

High levels of investment in green infrastructure and other amenities in the case study neighborhoods and population growth in the city as a whole have led to increasing housing costs in the case study neighborhoods and across much of the District. While the neighborhoods east of the Anacostia River have not experienced the as significant increases in rents as many neighborhoods west of the river, many Census tracts in the case study neighborhoods experienced increases in rents of 20 to 30 percent and greater (see Figure 25).

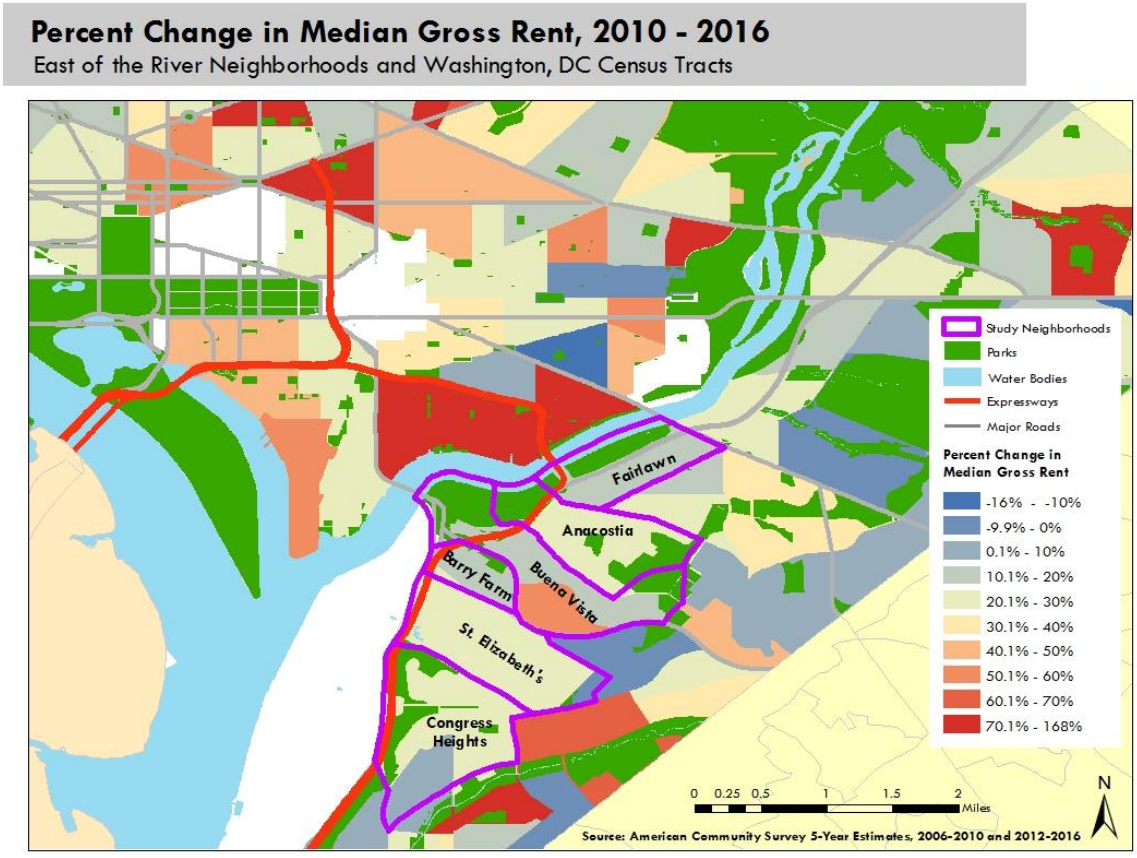


Figure 25: Percent Change in Median Gross Rent, East of the River Neighborhoods and Washington, DC Census Tracts, 2010-2016

Further, a large proportion of renters in the case neighborhoods can be considered housing cost burdened (defined as households spending more than 30 percent of income on housing). As seen in Figure 26, the median gross rent as a percentage of household income for many of the case neighborhood Census tracts is between 39 and 50 percent, indicating that many residents in these areas are already experiencing financial challenges in meeting their housing needs.

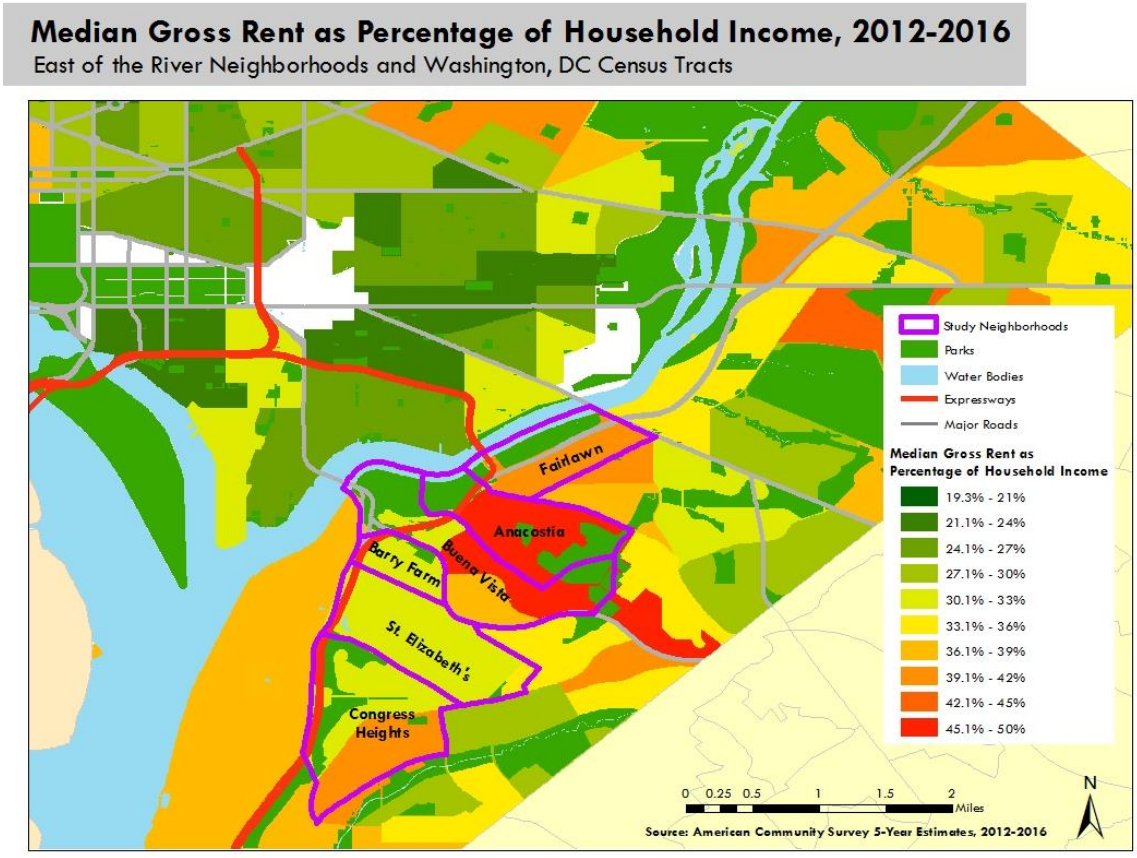


Figure 26: Median Gross Rent as Percentage of Household Income, East of the River Neighborhoods and Washington, DC Census Tracts, 2012-2016

The combination of a high proportion of residents who are already burdened by housing costs and increasing rents and housing values in the case study neighborhoods creates concerns surrounding housing affordability and displacement of existing residents in these neighborhoods.

6.2.4 Political Context Surrounding Housing Affordability

Washington, D.C. has greater local autonomy with regard to affordable housing preservation and development, as the city doesn't have to deal with state-level regulations such as Georgia's ban on rent control and limitations on impact fees for new development.

At the city level, several policies have been put in place to support affordable housing development and preservation. Some of the policies in place include an inclusionary zoning ordinance, which requires developers to devote 8 to 10 percent of floor area to affordable units in new projects of more than 10 units and in large rehabilitation projects; rent supplement and home purchase assistance programs; the Tenant Opportunity to Purchase Act, which guarantees tenants the right to come together to purchase a building before its landlord can offer it for sale; and a Housing Production Trust Fund, which provides $100 million per year to affordable housing development and preservation. Stronger existing policies surrounding housing affordability and greater autonomy to develop further policies in the future make Washington, D.C. a counterexample to Atlanta's less supportive political context and allow for the examination of the role of social capital within a wider variety of contexts.

6.3 Discussion

This chapter examined the similar histories and present situations of Atlanta, Washington, D.C., and the dissertation's case study neighborhoods with regard to segregation by race and income, engagement in green infrastructure planning, and increasing housing market pressures surrounding new and proposed green infrastructure amenities. Further, it provided an overview of the political contexts in the case cities, which shape the ability of neighborhood and city-level actors to develop and utilize social capital in addressing housing affordability and community benefits concerns.

As discussed in this chapter, Atlanta and Washington, D.C. both have high levels of segregation by race and income, have engaged in green infrastructure planning at a high

level, and have high levels of housing market pressure in previously lower-market areas surrounding new investments in green infrastructure (the case study neighborhoods). Yet, the case cities differ with regard to political context surrounding housing affordability, providing the opportunity to examine the role of social capital within these different contexts.

While green infrastructure projects and planning efforts in these case neighborhoods have generally been designed to address environmental justice threats such as water pollution, flooding, and lack of access to parks and green space, they have also frequently prioritized economic development goals. In this way, these projects have also catalyzed or amplified concerns associated with housing affordability, displacement of existing residents due to rising housing costs, and the ability of residents to stay and benefit from the new projects. In Chapter 7, I discuss interviewees' perspectives of the specific opportunities and threats associated with green infrastructure planning and implementation.

These opportunities and threats have created opportunities for the development of social capital surrounding shaping the projects themselves as well as advocacy for policy development surrounding housing affordability and workforce development concerns. Chapters 8 focuses on factors impacting the development of social capital within and outside of green infrastructure planning processes. Chapters 9 focuses on how social capital developed around green infrastructure has in turn shaped projects and their planning processes. Chapter 10 discusses how social capital developed around green infrastructure has shaped advocacy and driven the development of policies and strategies focused on housing affordability and community benefits. Finally, Chapter 11 discusses the

importance of the different political contexts of Atlanta and Washington, DC with regard to the ability of groups to shape neighborhood and project-level actors' capacities to develop and implement strategies addressing housing affordability and community benefits concerns. In Chapter 12, I conclude with a discussion and recommendations for policy and planning.

CHAPTER 7. THE OPPORTUNITIES AND THREATS POSED BY GREEN INFRASTRUCTURE PLANNING AND IMPLEMENTATION IN LOW-INCOME COMMUNITIES

Investment in green infrastructure projects often presents a host of implications for low-income communities in which projects are implemented, including the potential for both benefits and negative impacts. As described in the literature review, green infrastructure impacts environment and health qualities as well as land and housing markets, leading to the potential for a variety of positive and negative impacts on low-income communities surrounding these new investments (see Figure 27).

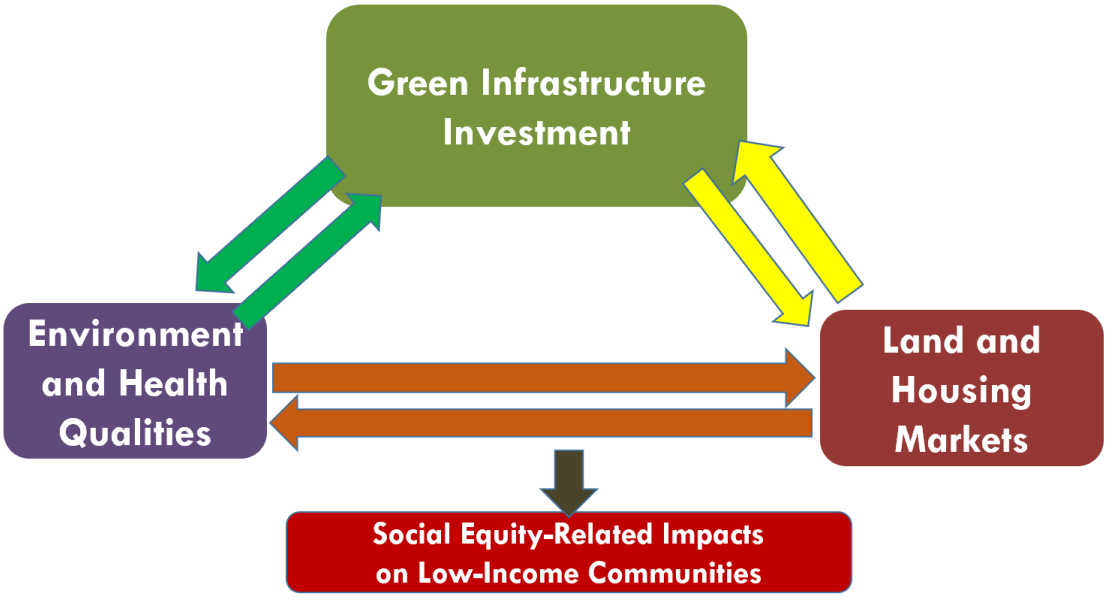


Figure 27: Opportunities, threats, and associated social equity impacts posed by green infrastructure in low-income communities

Along with Chapter 8, this chapter addresses the research question *"How does green infrastructure shape the development of social capital?*" In particular, this chapter responds to Hypothesis 2: *The planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that leads to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.* While this chapter details the variety of potential opportunities and threats posed by green infrastructure in low-income communities, Chapter 8 examines how green infrastructure reinforces social capital, including coalition building and information sharing around issues of housing affordability, gentrification, and community benefits.

In evaluating the first part of this hypothesis, section 7.1 examines the opportunities surrounding green infrastructure in low-income communities, and section 7.2 examines the threats posed by green infrastructure in these communities. Interviewees associated a variety of potential benefits with projects, including environmental opportunities such as managing stormwater and addressing health concerns associated with flooding, to social and economic opportunities such as providing access to parks, nature, and recreation opportunities, revitalizing neighborhoods, and reclaiming vacant land, among others. In addition to these potential benefits, residents and advocates described threats of a variety of forms of displacement of current residents, including direct and indirect displacement related to housing costs, cultural and neighborhood resource displacement, and political displacement. In addition to experiencing these threats in their own neighborhoods, interviewees also described witnessing or hearing about these forms of displacement taking

place in other previously low-income neighborhoods in their cities and in cities across the country.

7.1 Opportunities Surrounding Green Infrastructure in Low-Income Communities

Residents, community organizations, and government agencies described environmental, social, and economic opportunities and benefits associated with green infrastructure implementation.

7.1.1 Opportunities for Improving Environmental Quality

As described in the literature review, green infrastructure presents a variety of opportunities for improvements in environmental quality, including impacts related to stormwater management, improved air and water quality (Hoyer, Dickhaut, Kronawitter, and Weber, 2011), adaptation to climate change impacts (Gill, Handley, Ennos, and Pauleit, 2007, Stone, 2012, Norton et al, 2015), and increased biodiversity (Tzoulas et al., 2007, Forman, 2008,), among others (Beatley, 2011). While green infrastructure presents a host of potential environmental benefits, residents and community groups interviewed for this case study focused primarily on the potential for projects to address flooding and stormwater management concerns, to mitigate the health and financial impacts associated with chronic flooding, and to improve water quality in contaminated water bodies, allowing residents to utilize the waterways as they had prior to their contamination. In this way, the environmental benefits of green infrastructure present an opportunity to address other concerns, such as health, housing costs, and access to water bodies and green space. Other benefits such as adaptation to climate change impacts and increased biodiversity were

included in plan documents but were generally not described by interviewees as primary drivers of green infrastructure implementation for the case neighborhoods.

7.1.1.1 Addressing Flooding and Stormwater Management Issues

Grassroots organization leaders, park nonprofit staff members, government agency staff members, and neighborhood residents discussed the importance of using green infrastructure to address flooding and stormwater management concerns. These concerns were most prominent in the Atlanta case, as portions of the city's Westside neighborhoods have experienced chronic flooding for several decades.

In Atlanta's Westside neighborhoods, which have historically experienced significant flooding and combined sewer overflows due in large part to runoff from the city's downtown area, the potential for improved stormwater management presented an important opportunity to reduce flooding and its impacts on property and health. Frequent flooding in these neighborhoods has caused damage to homes, which is expensive to address and may create serious health hazards for residents, with issues such as the development of mold in housing units. Further, low-income residents may not be able to afford to make changes to their yards or homes that would mitigate the impacts of flooding. As one government staff member described,

> "It's particularly bad where people aren't able, can't afford to do things to their yard to try to deal with erosion or where people can't do things for their house like fix gutters and fix their roofs so that they can route water away from their house when it rains and that kind of thing. So, I think that they have some, some of the households in this neighborhood has some issues just dealing with the same kind of localized flooding, or those are drainage issues that people in other parts of town might be able to hire landscape contractors to deal with. People in this area of town might not be able to deal with that, so that exacerbates those kinds of issues."

Frequent flooding has also led to the displacement of residents, and green infrastructure presented an opportunity to mitigate this displacement. As one community leader described,

> "The community felt fatigued. It felt like we've been studied; we've talked about all of these problems. The Corps of Engineers and the City come in, and as soon as we get flooding, it's not proactive. They still relocate the community. The only approach that seems to happen when a community like Vine City or English Avenue…or the communities around Grove Park, when people get flooded out, they get moved. Why can't we do something proactive, so that the people don't get moved? And in order to do that, we need to highlight, 'why should we want to stay?', 'what's good about it?' Like, the first thought is, 'well, you've been flooded out. You don't want to stay, so you don't have to stay'…moving shouldn't be the only option, if that makes sense."

In this way, green infrastructure implementation presented an important opportunity to address flooding and stormwater management issues and associated concerns surrounding health and the ability of residents to remain in their homes and neighborhoods.

Neighborhood residents' focus on addressing flooding and stormwater management concerns catalyzed the planning for much of the green infrastructure recently developed or in the process of being implemented in Atlanta's Westside neighborhoods. In particular, residents' engagement with these concerns led to the development of the *Proctor Creek North Avenue Green Infrastructure Vision*, a green infrastructure plan that aims to address repeated flooding in the city's Westside neighborhoods. The plan was created in 2010 after residents approached the nonprofit Park Pride about creating a park to address flooding concerns. The organization's Executive Director Michael Halicki noted in an interview by the Saporta Report,

> "The community is the one who said, 'If you're going to build a park, can you deal with other issues?' That was not Park Pride coming in to solve flooding. We were

there to build a park. ‘Able’ Mable Thomas asked if the park could help deal with flooding” (Pendered, 2018).

The vision plan has served as a guiding document for green infrastructure development in the Westside neighborhoods, with government agencies and nonprofit groups working to implement a variety of the plan’s proposed green infrastructure projects. Several parks in the vision plan’s proposed green infrastructure network have been implemented since the development of the plan in 2010.

Government agencies have also viewed green infrastructure as an opportunity to address flooding and stormwater management concerns. While Atlanta’s Westside neighborhoods have experienced more issues of chronic flooding, agencies in both cities have cited flooding and stormwater management concerns as primary reasons for green infrastructure planning and implementation citywide. Atlanta’s Green Infrastructure Strategic Action Plan lists urban flooding and reducing combined sewer overflows as drivers of green infrastructure implementation (City of Atlanta Department of Watershed Management, 2017), and D.C. Water has utilized green infrastructure to reduce stormwater runoff and limit combined sewer overflows (D.C. Water, 2015).

7.1.1.2 Cleaning up Impaired Waterways

Interviewees also noted that the opportunity to clean up impaired waterways presented an opportunity to provide access to an amenity, improve residents’ health, and create jobs for residents in cleaning up the impaired waterways. Residents lamented not being able to use the creek in the ways that it had been used in previous decades. As one grassroots community organization leader described, “If you have gold in your community and you don't have access to the gold, that's an issue, okay? You have the creek there and

the creek is not accessible to the people." Several interviewees discussed the history of residents using Proctor Creek for fishing and baptisms, noting that people still use the creek for fishing even with signs pointing to elevated pollution levels in the creek. As one government agency staff member described,

> "People still fish. You can put the signs up, but if people don't have food, they're going to go where they can get food, and it's a food desert out there…So when you have a food desert, and African Americans like their fish, so they still fish."

Green infrastructure presents an opportunity to reduce combined sewer overflows, thus improving the water quality of urban waterways and allowing residents to safely use the waterways for activities such as fishing, swimming, and baptisms.

Multiple grassroots and nonprofit organizations have formed in response to addressing environmental justice concerns associated with impaired waterways, the locations of wastewater treatment facilities, and neighborhood access to clean parks and waterways. In Atlanta, the West Atlanta Watershed Alliance, ECO-Action, the Proctor Creek Stewardship Council, and the Watershed Learning Network formed to address environmental justice concerns and have focused on improving water quality in the Proctor Creek watershed, among other concerns. Citizen groups and individuals were responsible for the consent decrees requiring Atlanta and Washington, D.C. to improve water quality in Proctor Creek and the Anacostia River. Nonprofit and grassroots organizations have also supported further collaboration at the government level. For example, the West Atlanta Watershed Alliance actively engaged with the U.S. Environmental Protection Agency to promote the agency's selection of Proctor Creek in Atlanta as a site for the Urban Waters Federal Partnership.

Driven by their consent decrees and efforts of nonprofit and grassroots groups, government agencies have made the cleanup of impaired waterways a primary focus. Green infrastructure planning efforts at the municipal level, such as D.C. Water's green infrastructure and the City of Atlanta Green Infrastructure Strategic Action Plan, describe the reduction of combined sewer overflows and addressing the consent decrees as primary drivers of green infrastructure implementation. At the federal level, collaborative efforts to improve water quality include the Anacostia Waterfront Initiative and the Anacostia Watershed Restoration Partnership in Washington, D.C., and the Urban Waters Federal Partnership in both Atlanta and Washington, D.C.

7.1.1.3 Preservation of Natural Ecosystems

Interviewees also described the preservation of natural ecosystems as an environmental benefit of green infrastructure, noting that previous disinvestment in the case neighborhoods presented an opportunity for preservation of natural areas and more sensitive development. As one government agency staff member in Washington, D.C. described regarding the potential for the preservation of natural ecosystems,

> "Because of the way that the city developed over time, a lot of these areas were neglected, but then…the fact that they were neglected, I think we're turning it around in a sense and saying, "Well, that actually presents an opportunity because a lot of those natural areas are unique in the city and actually present an opportunity now…Maybe there's a potential for natural area expansion. There's a lot of potential for preservation of our natural ecosystems along the Anacostia, and I think people are finally awakening to that."

Green infrastructure was also viewed as an opportunity to develop areas in a more sensitive way that would preserve ecosystem functioning. As one Atlanta grassroots group leader emphasized,

> "Proctor Creek needs to have…a conservation district, maybe based on the consent decree. Something that says we're going to be uber restrictive in this watershed, for these reasons. Because of the sensitivity of the water quality, because of the environmental justice legacy, disenfranchisement of the residents. I would like to see a stacked deck that says, "We're gonna do the Proctor Creek development so critically, radically different because of these social and environmental issues because we have the opportunity to slow things down." And hopefully take that approach to see that green infrastructure is rolled out, that housing is deployed, that jobs are created in a very different way that is not haphazard, it's not scattershot. That it's really done from a much more informed plan."

In this way, preservation of green infrastructure in the form of natural areas created an opportunity to preserve ecosystem functions in the case neighborhoods.

7.1.2 Social and Economic Opportunities

In addition to environmental opportunities, residents, community organizations, and government agencies described social and economic opportunities associated with green infrastructure. As described in the literature review, social benefits may include improvements in public health and quality of life resulting from reduced flooding or improved air and water quality (Hoyer, Dickhaut, Kronawitter, and Weber, 2011), access to parks and recreational opportunities, and increased wellbeing and mental health associated with access to nature (Beatley, 2011, Wolch, Byrne, and Newell, 2014, Chawla, 2015, Cheisura, 2004). Green infrastructure may also support experience of natural ecosystems, experience and interpretation of cultural history, and opportunities for artistic expression and environmental education (Ahern, 2007).

With regard to economic opportunities, green infrastructure may support local economic development (Rouse and Bunster-Ossa, 2013, Ahern, 2007), job and business opportunities, and food production (Agyeman, 2013). Further, green infrastructure may support cost savings relative to gray infrastructure expenses resulting from aspects such as

reduced energy use and maintenance costs, and more moderate microclimates (Rouse and Bunster-Ossa, 2013, Jo and McPherson, 2001). Additional economic impacts of green infrastructure include costs avoided by reductions in commuting by car (for greenways and trails) and improved traffic safety (Vandermuellen et al, 2011). Increasing property values associated with green infrastructure (Bolitzer and Netusil, 2000, Acharya and Bennett, 2001, Nicholls and Crompton, 2005) may serve as both an opportunity and threat.

While green infrastructure may provide a host of social and economic opportunities, residents and community organizations focused on the potential for projects to provide access to parks and recreation opportunities; support neighborhood revitalization and reclaim vacant land; provide opportunities for community leadership and engagement; support wealth creation through workforce development and job creation; and address housing affordability concerns through the development of affordable housing and reductions in utility costs, among other opportunities.

7.1.2.1 Providing Access to Parks and Recreation Opportunities

The potential for developing parks and green space in neighborhoods lacking in these amenities also presented an important opportunity for neighborhood residents, nonprofit and grassroots organizations, and government agencies. While the development of parks was frequently combined with additional goals, such as addressing flooding concerns, access to parks also constituted an important goal in itself. Atlanta's English Avenue neighborhood did not have a park within its boundaries until the development of 1.5-acre Lindsey Street Park, completed in 2015, for which neighborhood residents approached park organizations about developing the park. Interviewees described

additional opportunities arising from the development of parks and open space, including providing places for youth to play and engage, community meeting space, and recreation opportunities. In this way, access to parks and greenspace created additional benefits outside of park access.

7.1.2.2 Supporting Neighborhood Revitalization and Reclaiming Vacant Land

In addition to the potential for supporting, residents, government agencies, and nonprofit groups also often viewed green infrastructure as an opportunity to support goals surrounding neighborhood revitalization. Residents often viewed green infrastructure as an opportunity to address issues such as vacant properties, which frequently posed security concerns. As one nonprofit staff member described,

> "There is a local resident, and a well-known leader in the neighborhood. She was head of the neighborhood association for a while…she rented a house on the corner immediately adjacent to Lindsay Street [Park], and keep in mind that before Lindsay Street was built it was six abandoned lots that were four feet high in kudzu, and old dilapidated home that was sometimes used for drug dealing and other things. And so basically those were all security risks and just part and parcel of the bigger problem with vacant and abandoned lots in the neighborhood. So after transforming them into a park, she actually, she and her daughter were able to figure out a way to purchase the property, and they did that because now they actually had something next door that they knew was going to improve their future property value and that is was also just worth staying, frankly."

Residents were also active in clearing lots to reclaim them for parks and green infrastructure. As one nonprofit staff member described,

> "There was a woman named Mattie Freeland, who lived across from the [current Mattie Freeland Park], and she was sort of the 'neighborhood mom,' and as she got older, she couldn't really get around much. There was a vacant, abandoned, overgrown lot across the street from her house. From the other direction was the local pastor to a church, and the church had actually bought that vacant property. She went to the pastor and said, 'Hey, I can't get out much. I don't want to look at a vacant lt. Can you guys do something to make it look better?' That's really the

> catalyst for this park…[Mother Mattie's house is] now a neighborhood house, where they can have meetings, and there's facilities, and they can have storage there. It's just a tremendous outcome that these community members have made happen."

In this way, residents often advocated for green infrastructure in their neighborhoods with the goal of neighborhood revitalization, which was often associated with concerns for increasing safety and security, utilizing vacant land, and creating community assets.

7.1.2.3 Supporting Community Leadership and Engagement

The opportunity for community leadership and participation in shaping green infrastructure projects also presented an opportunity for neighborhood residents to shape quickly-changing neighborhoods. In many cases, residents advocated for the development of parks and green infrastructure to address concerns such as flooding, and participation in green infrastructure planning processes provided opportunities to shape project design, which amenities would be included, and the ability to address concerns associated with housing affordability and community benefits, such as jobs and workforce development opportunities. Some planning processes presented opportunities for high levels of neighborhood leadership, such as the 11th Street Bridge Park's Community Land Trust Advisory Committee in Washington, D.C., two thirds of whose members were neighborhood residents.

Community leadership and engagement in planning processes also presented an opportunity to shape how changes would take place and to reduce threats of cultural and political displacement. As one nonprofit staff member described,

> "Gentrification is a huge concern on the West Side. I mean, we all saw what happened on the East Side, around Fourth Ward Park, and the BeltLine, so it's at

> the top of everyone's minds. English Avenue, I will say, is a little different in that they have about a 60% vacancy rate. So there is more than enough space for people to move into the community. What their concern is is that people want to move into the neighborhood and make it a new neighborhood, and not really engage those that were already there. So I think by having community members more involved in these green spaces, and in these development plans, then they feel like they have a role and a voice in the changes in their neighborhoods…I don't think that these parks are in any way going to solve gentrification in the long-term, but what I do think is that they are empowering residents to understand that they can participate. That they don't have to feel like they're stuck waiting on this thing to happen to their neighborhood, which I think is sort of how a lot of people perceive the force of gentrification. It's something that happens to them and is put onto their neighborhood. When you are instead involved in the plans that are coming for your community, and you are helping to lead the charge on that, and you know all the things that are going on, and you're educated about how you can be involved in planning, then you feel a little more empowered."

7.1.2.4 Supporting Wealth Creation: Workforce Development and Jobs in Green Infrastructure

Workforce development and job creation were also noted by residents in planning processes as important opportunities surrounding green infrastructure implementation. As the case study neighborhoods had higher levels of unemployment and poverty relative to the rest of their cities, residents often viewed green infrastructure as opportunities for workforce development and job creation, a view that was expressed frequently in planning processes. As one park non-profit leader described regarding Lindsey Street Park in Atlanta,

> "When [the idea for a park was] introduced by neighborhood residents, it wasn't a very well thought out plan or exact idea of what it was. I think the bottom line was just they're saying, "it's great, yes, we need a park." And actually at that time English Avenue had no park…they wanted to clean up some of these abandoned vacant lots, but they're saying, when you're in a neighborhood with the highest poverty rate and likely one of the lowest employment rate in the city that there needs to be outcomes beyond getting a new park. And it's not enough to say we're gonna improve this park and your property values will go up, and the reality is 10 to 15 percent of the residents there even own a home. A lot of them are renters, so that's not even relevant to them, and that actually can be perceived as a way they

> may ultimately lose their place there…so, that actually meant like what are the direct benefits?...Are there jobs for local residents?"

Several green infrastructure plans examined as part of this study mentioned workforce development or included specific workforce development components. However, job creation and economic development were often mentioned in passing without specific goals, recommendations, or requirements for implementation. The potential for job creation surrounding green infrastructure is mentioned in the Sustainable DC plan, the City of Atlanta Green Infrastructure Strategic Action Plan, and the Proctor Creek North Avenue Green Infrastructure Vision plan developed by the non-profit Park Pride in Atlanta. However, these documents provide very limited to no guidance surrounding the implementation of green infrastructure jobs or workforce development programs. For example, in Park Pride's 2010 green infrastructure vision plan the creation of green jobs was included under the 'Community's Overarching Goals and Wish List," and the plan lists the potential for "low and unskilled job opportunities suitable for people who are not already part of the workforce" as one of the benefits of green infrastructure (Park Pride, 2010, p. 92). However, as the plan did not provide funding for implementation, the projects have been implemented over time by various nonprofit organizations or government agencies, which either did not implement workforce development or job creation components as part of the projects or implemented them at very small scales.

7.1.2.5 Addressing Affordability Concerns: Housing and Utility Costs

Residents and advocates also viewed green infrastructure as an opportunity to address affordability concerns through the development and preservation of affordable housing.

Housing affordability was a primary concern of residents within many of the green infrastructure planning processes examined as part of the study. In the case of the Atlanta Beltline, advocates pressed for the addition of affordable housing goals to plans for the project's implementation, resulting in the addition of a goal of the creation of 5,600 affordable units within the project's Tax Allocation District. During the planning process for the 11th Street Bridge Park, residents and community organizations supported the inclusion of recommendations such as the development of a community land trust in the project's Equitable Development Plan.

While preserving housing affordability was often viewed as an opportunity, issues of displacement associated with new investments were viewed as threats. In this way, residents and advocates often viewed the inclusion of mechanisms to support the preservation of affordability and the addition of new affordable units as opportunities and as ways to address threats of displacement. Threats posed by green infrastructure planning and implementation in low-income communities are discussed in section 7.2.

Another component of affordability noted by residents and government and nonprofit staff members was the potential for reductions in utility costs associated with green infrastructure. As one resident described involved in green infrastructure planning in Atlanta noted, "We expect to save money and transfer that to economic growth in the community. When the poor are paying exponentially more for their heating and cooling bills and from resources that are already very limited, it creates even further hardship." In this way, the use of green infrastructure to reduce utility costs by reducing stormwater storage and treatment costs presented an opportunity for residents.

7.1.2.6 Other Social and Economic Opportunities

Additional social and economic opportunities described by interviewees included connecting neighborhoods and bridging racial and economic divides. As one planner involved in the Atlanta Beltline project described regarding the project's ability to connect people in different neighborhoods,

> "There's something really beautiful about tying [the city] together that really resonates with people. One of the early board members of the Beltline Partnership…what he loved most about the project was that it connected kids from one side of town to the other side of town. They got to get out of their neighborhood and see what life was like in other neighborhoods and build understanding between different people in a way that was really powerful"

While these opportunities were emphasized most by nonprofit staff members involved with green infrastructure projects, they were also described by some residents as opportunities for green infrastructure projects which focus heavily on investing in neighborhoods surrounding projects and addressing concerns outside of green infrastructure design and implementation.

7.2 Threats Posed by Green Infrastructure in Low-Income Communities

While green infrastructure projects had the potential to bring a variety of benefits to low-income communities, the impacts of projects at the neighborhood level were often perceived as threats. Interviewees described concerns associated with direct and indirect, cultural, and political forms of displacement.

7.2.1 Direct and Indirect Displacement

Interviewees described direct and indirect displacement due to rising housing values and costs as primary concerns associated with investments in green infrastructure. These concerns focused on increasing housing values in areas that had previously experienced disinvestment, the lower incomes of existing neighborhood residents, and the experiences of other neighborhoods and cities with displacement from investments in green infrastructure and other neighborhood revitalization or urban renewal projects.

The Westside and Ward 8 neighborhoods have experienced decades of disinvestment relative to the rest of their cities, including investments in infrastructure, schools, and addressing flooding issues. As one nonprofit staff member in Atlanta described disinvestment in the city's Westside neighborhoods,

> "I mean we take a lot of people on tours there from other places…and they're shocked that footsteps from downtown you have some of the highest vacancy rates, poverty rates, massive stormwater flooding…you name the problem and they have it…It's difficult, and I think it's a problem that basically has unfolded over many decades of disinvestment and different things have caused it, so it's really difficult to think about how you approach it in one project or even a short time period because the reality is that a lot of families, especially working-class families, and schools and things are gone. I mean they left long ago. And so, those neighborhoods have really suffered from a lack of investment over time and that's in infrastructure and addressing stormwater flooding, and so it's really difficult."

Disinvestment is also connected with racial and income-based segregation and physical separation of the neighborhoods from the rest of their cities. As one nonprofit staff member in Washington, D.C. described,

> "East of the River is an area that has seen a history of neglect of investment. It is predominantly African-American, 96, 98 percent African-American. To give you a sense of income, the average income west of the river in Capital Hall and Navy Yard is about $104,000. The east of the river [incomes] are at $35,000. There's a $390,000 difference between homes on one side of the river and the other side of the river, so it gives you a sense of the economic divide that's there. I mean the

> river, not only geographically has a sort of barrier, but it's also been a barrier based on race and income, and all sorts of things."

Yet, in these contexts of historic disinvestment, population increases in the cities as a whole and new development have created concerns surrounding increasing housing costs and displacement of existing residents in the case neighborhoods in recent years. Interviewees in Washington, D.C. described a city "that has rapidly gone through change" and is quickly gaining population. These population increases have led to increasing housing values in the city as a whole, including, in recent years, neighborhoods east of the Anacostia River. As one nonprofit staff member described,

> "We're starting to see change now in the neighborhood because D.C. is only 62 square miles big, and a third of it is owned by the federal government, and there's people moving into the city every day. So that means land is becoming more and more of a premium, and we've been seeing development kind of spread from the west side of the city eastward. We're starting to see those impacts east of the river now."

Increasing housing values have also been spurred by new development in the case neighborhoods, including the development of new sports facilities—Atlanta's Mercedes Benz stadium and Washington, D.C.'s Wizards and Mystics facility, which is part of the larger St. Elizabeth's Hospital redevelopment project.

As populations in the cities have increased, investments in green amenities have further spurred concerns around displacement of existing residents in the case neighborhoods. Larger green infrastructure projects such as the Atlanta Beltline and the 11th Street Bridge Park have catalyzed concern to the greatest extent, with residents responding by advocating within and outside of planning processes for these projects to address housing affordability and community benefits concerns.

The ways in which large projects such as these have dealt with issues of increasing property values have shaped residents' and advocacy groups' concerns. For example, the Atlanta BeltLine has been funded by a Tax Allocation District (TAD), meaning that the project's ability to be implemented was predicated on the fact that surrounding property values would increase, funding the TAD and the project's implementation. TADs, also known as Tax Increment Financing (TIF) districts, have become an important way in which local governments can protect and support property values (Weber, 2010), and the Atlanta BeltLine's use of the mechanism to fund the its development signified the project's support for and reliance on increasing property values in surrounding neighborhoods. In contrast, the 11th Street Bridge Park is funded by the District Department of Transportation and by funds raised by the nonprofit organization Building Bridges Across the River. Although the project does not rely on increasing property values in surrounding neighborhoods as the Atlanta BeltLine does, increasing population in Washington, D.C. and increasing housing values in East of the River neighborhoods in general have led to similar concerns of gentrification and displacement in the neighborhoods surrounding the project.

The threat of displacement also results from the lower incomes of residents in the Westside Atlanta and Ward 8 Washington, D.C. neighborhoods. As detailed in Chapter 6, residents in the case neighborhoods tend to have lower incomes and higher rent burdens than residents in other city neighborhoods, increasing the potential for displacement with rising housing costs. Rising housing costs could include increasing housing values for potential homeowners, increasing property taxes for existing homeowners, and increasing rents in rental properties.

Finally, concerns surrounding displacement are rooted in the witnessing of increases in housing values surrounding green infrastructure projects in other neighborhoods or other cities that had invested in green infrastructure projects. One nonprofit staff member in DC noted that "this is post-High Line in New York City," and that a market analysis commissioned for the 11th Street Bridge Park "kind of reiterated what we were already thinking, and what we had been seeing in DC already"—that development of the park would lead to significant increases in housing costs in the surrounding neighborhoods. As one interviewee involved with the 11th Street Bridge Park's community land trust noted,

> "I think the neighborhood in Anacostia and around there are home to the communities that have seen large scale urban projects not work to their benefit. In fact, the contrary. The legacy of urban renewal and Hope VI, and everyone is sort of aware of what happened around the High Line in New York and how that touched off gentrification in that area."

In Atlanta, interviewees described seeing the impacts of the Beltline project on the East side of the city and the rapid increases in housing values associated with the trail. As one staff member at a grassroots environmental organization described,

> "We can't afford to hope that [residents] get to stay, cause we saw on the East side that they didn't get to stay, and in a lot of places, they're not able to stay, in a lot of cities that are implementing green infrastructure."

These concerns also focused on displacement of communities of color in particular. Another grassroots housing organization leader described the changes in Atlanta's Old Fourth Ward neighborhood and their connection to the development of the Atlanta Beltline.

> "We've seen how development comes in and just totally eviscerates communities, such as the one like in Old Fourth Ward. Old Fourth Ward was a very thriving community of people of color, particularly black people, working class people, and folks of lower income. Since the inception of the BeltLine and its development

> there, it has totally wiped out the lower income folks over there, and the black folks. You may have, it used to be maybe 94 percent African American, and now it's maybe 87 percent white. And all of this is from the development of the Atlanta BeltLine."

Residents also described how their families had experienced displacement in the past and their concerns for a lack of policy in place to prevent future displacement as new investments come into the area. As one grassroots organization leader in Atlanta described,

> "My grandfather had to get out of Buttermilk Bottom for the creation of the Civic Center, which has now been sold. Then we moved a little north up, and moved into the Old Fourth Ward, and to be displaced again by the highway, over into the Summerhill area, only to be displaced again by the Atlanta Fulton County Stadium. And then, once we have finally found some type of stabilization, we also are being threatened again by the redevelopment of Turner Field, and also this BeltLine. So, we see this happen over and over again, and everybody, there's a lot of chitter chat, there's a lot of talk about it. But there isn't any responsible policy put in place so that this doesn't happen again."

In this way, residents have often experienced direct displacement from other large redevelopment projects in the past and may view green projects as a potential continuation of that displacement.

7.2.2 Cultural and Neighborhood Resource Displacement

In addition to concerns surrounding direct displacement, interviewees described concerns associated with a loss of community culture, including a sense that new amenities were not built for current neighborhood residents, clashing of socioeconomic and racial groups, policing of existing residents' behaviour by new residents, or a loss of local businesses with increasing rents.

Some residents described new green infrastructure projects as built for residents other than those who currently lived in the neighborhoods. While this threat was connected

to concerns associated with displacement of existing residents, it also included concerns associated with the lack of focus on and incorporation of current neighborhood residents' concerns in projects and was particularly strong in projects which provided few opportunities for public participation. As one non-profit staff member described the development of Atlanta's Proctor Creek Greenway,

> "unfortunately, what's been happening with the City especially is that they're not including Grove Park in the conversation. So for example, the Proctor Creek Greenway trail, there's no access from the neighborhood onto the trail. There's no spur trail built out. So anybody from the neighborhood who wants to access the trail has to go down to the Bankhead MARTA station and access it like anyone else in the city would. So there's a sense among Grove Park residents that the trail was not built for them, it was built for future residents who don't live here yet, and that it's just another example of an investment that isn't meant for the existing residents. Which is frustrating, and for them points to signs of displacement."

In this way, fewer opportunities for community engagement led to projects which did not meet the needs of neighborhood residents and were viewed as investments to benefit future residents.

Neighborhood residents also described a clashing of residents of different socio-economic levels and races, and an increase in policing of existing residents' behavior. These concerns increased as increasing numbers of wealthier residents moved into lower-income neighborhoods. As one resident of Washington, D.C.'s Ward 8 neighborhoods described,

> "For DC, it is so expensive, to say the least, that it's just really so expensive on the other side of the river that there aren't a lot of options and a lot of choices for people. We get a clashing of different classes and socioeconomic statuses and different ethnicities and races over here in Ward 7 and Ward 8, because there just aren't a lot of opportunities to purchase something or to even rent something if you have a family. On the other side of the river it's just really that expensive. That leads to the fact that it is still somewhat affordable over here. It means that people, more professionals are going to move over here. That's going to have a clash of the

> classes and put stresses on people in neighborhoods because now all of a sudden you have people who are calling the cops on people standing on the corner even though that's just what a lot of people do is just hang out and talk with people, set up their lawn chairs and sit out and talk. It creates a lot of stresses where you have people raising noise complaints because a storefront that normally plays music, has been playing music for the last X amount of years but now it's just a different class and different type of neighbors that are enforcing their own culture or their own standards on life in the community. Yeah, there are a lot of those stresses, and that they're just bound to even rise and increase with the amount of people that need to come over here to find someplace they can afford to live."

Finally, interviewees described the potential for the loss of neighborhood resources and character, including historical character and neighborhood businesses. As one non-profit leader working in Atlanta's Westside neighborhoods described regarding residents' focus on preserving the neighborhoods' historical character,

> "[One of residents' main concerns] was around preserving the character and the history of the neighborhoods. So, historically, these were African-American neighborhoods. At one point they were pretty vibrant, and great leaders came out of these neighborhoods, musicians, et cetera. So a lot of it was, we don't want all that blown away either. So there was a real emphasis on preserving the historical character of the neighborhoods, and the historical landmarks, et cetera, was another big theme…There are no design standards in the Old Fourth Ward, right? You can just do what, that's why most people go in there. They knock down a home, then they buy two pieces and build up the 6,000, right? It's all goofy right?"

Further, increases in rents for businesses surrounding new green infrastructure investments presented a threat for these existing neighborhood businesses. However, residents also discussed residents' desires for new businesses and amenities in neighborhoods that had experienced disinvestment in the past. As several neighborhoods had high levels of vacancy and disinvestment, new investments surrounding green infrastructure amenities presented the opportunity for needed services and retail in neighborhoods that had lacked them for decades. As one resident of Washington, D.C.'s Ward 8 neighborhoods described,

> "There are a number of the developments that people are really excited about. But there are also other developments that we're also really concerned about. It's kind

> of a double-edged sword on most of them. A lot of people expressed the desire to have more sit-down restaurants and more amenities in the community. But the big concern is that these different amenities and different things that come into the neighborhood, that they're not going to push people out."

In this way, new investments in amenities presented a "double-edged sword," as they brought needed services and retail, while also presenting a risk of displacement for existing small businesses and residents.

7.2.3 Political Displacement

Interviewees described political displacement as another threat associated with green infrastructure planning. Residents described the potential for project leadership to hold superficial community engagement processes, done so that agencies could fulfil minimum requirements for public participation. As one resident of Atlanta's Washington Park neighborhood described,

> "Those are decisions that the way the city government operates, they're gonna simply say, "We did X amount of community engagement meetings. We let the people know X, Y, and Z. And they're gonna say they did their due diligence. That's the bottom line. That's the way the system works…an individual citizen has limited amount of impact in the face of a municipality that has decided that they're gonna put in a multi-million, hundred million dollar project."

The provision of minimal opportunities for public engagement in green infrastructure planning processes led to concerns regarding residents' and community organizations' ability to shape projects and policy. As one non-profit staff member described regarding Atlanta's Proctor Creek Greenway and Westside Reservoir Park,

> "I think sort of everyone's sense is we know that these two projects are really going to greatly affect the economics and housing prices in the neighborhood, but since we feel like we've been cut out of the conversation, there's no sense of recourse or opportunity for us to raise awareness or get support or policy decisions being made.

> That could help this kind of feeling of hopelessness around [the Proctor Creek Greenway and Westside Reservoir Park], or frustration, really."

Finally, interviewees described concerns surrounding the political displacement of existing grassroots and community organizations as larger redevelopment organizations and agencies focused more on the neighborhoods. For example, one grassroots non-profit leader noted concerns that the Westside Future Fund, a recently-formed non-profit organization focused on the revitalization of Atlanta's Westside neighborhoods and developed largely by Atlanta's corporate, university, and nonprofit leadership, could displace the influence of smaller groups with fewer resources that have been working in the neighborhoods for decades.

7.3 Discussion

This chapter examined the opportunities and threats posed by green infrastructure in low-income communities. The evidence presented in this chapter supports the first part of Hypothesis 2, which posited that *the planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that leads to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.* This chapter demonstrated that investments in green infrastructure pose a variety of opportunities and threats in low-income communities. The next chapter addresses the second part of the hypothesis, how the opportunities and threats associated with green infrastructure lead to the development of social capital around issues of housing affordability, gentrification, and community benefits concerns.

As described in the chapter, green infrastructure presents a variety of opportunities, including opportunities for improving environmental quality, as well as social and economic opportunities. Interviewees described these opportunities as particularly important in the case neighborhoods, which have experienced disinvestment in the past and have a need for many of green infrastructure's potential benefits, including reducing flooding in areas that have experienced chronic flooding issues; cleaning up contaminated waterways; revitalizing neighborhoods and reclaiming vacant land; and providing opportunities for recreation and access to nature in areas with limited access. While green infrastructure provided a host of potential benefits, projects also brought threats associated with gentrification and displacement. Displacement took the form not only of direct displacement of residents from their homes due to increasing housing costs, but also of cultural and political forms of displacement.

Overall, a variety of interviewees emphasized the environmental benefits of green infrastructure, which focused on addressing flooding and stormwater management issues and cleaning up impaired waterways. For example, approximately one fourth of interviewees discussed the use of green infrastructure to address flooding and stormwater management concerns, including park nonprofit staff members, grassroots organization leaders, residents, and government agency staff members. In Atlanta's Westside neighborhoods, where chronic flooding and stormwater management are prominent concerns, neighborhood residents' focus on these issues drove a comprehensive green infrastructure planning effort, the Proctor Creek North Avenue Green Infrastructure Vision, which has been the basis for much of the green infrastructure planning that has occurred since 2010.

With regard to social and economic opportunities, park non-profit organizations and government agencies tended to focus planning processes on the benefits of providing access to parks and recreation opportunities, supporting neighborhood revitalization, and creating opportunities for community engagement, while these groups' discussions of issues of jobs, workforce development, and housing affordability were generally driven by residents' emphasis of the importance of these issues during planning processes. Specifically, interviewees associated with approximately one third of the green infrastructure planning processes in the case neighborhoods described how projects' initial focus on a few potential benefits of green infrastructure projects evolved following discussions and advocacy from residents during green infrastructure planning processes to encompass a broader array of concerns, including benefits associated with wealth creation and housing affordability, as well as threats of displacement.

Overall, perspectives on the opportunities and threats associated with green infrastructure varied by whether interviewees were involved with planning of green infrastructure projects or were residents of neighborhoods in which projects were being implemented. Notably, interviewees from park non-profit organizations and government agencies focused primarily on the benefits of green infrastructure, including addressing flooding and stormwater management, providing access to parks and recreation opportunities, supporting neighborhood revitalization, and creating opportunities for community leadership and engagement. Neighborhood residents and grassroots organizations also focused on these opportunities associated with green infrastructure; yet, interviewees in these categories were more likely to also express concerns around threats of displacement. While park nonprofits and government agencies were also

conscious of residents' concerns around displacement, they were more likely to emphasize the equity concerns associated with access to parks and greenspace over the threats of displacement. As one park non-profit staff member stated,

> "If you talk to the community residents, in English Avenue for instance, they want—I mean this is an equity issue too—they deserve a park just like every other neighborhood in the city of Atlanta. So, one response to all the discussions about gentrification is that okay, well just don't improve the neighborhoods and then you won't have to worry about new people coming. Which is ridiculous, and that's not what the neighbors want either."

Here, park access is framed as occurring alongside gentrification, and the alternative to gentrification is not improving neighborhoods with parks and green infrastructure. Using this reasoning, park non-profit groups focused their work primarily on providing park access and environmental benefits through green infrastructure, while noting that threats of gentrification and displacement fell outside the scope of their efforts and needed to be addressed in other ways.

Meanwhile, residents who participated in park planning processes viewed the opportunities and threats of green infrastructure as more interconnected and thus often expressed desires that housing affordability and community benefits concerns be addressed in green infrastructure planning processes. In this way, different groups of actors focused at varying levels on the different opportunities and threats posed by green infrastructure in low-income communities, with park nonprofits and government agencies framing projects primarily in terms of benefits of park access and improvements in environmental quality and residents and grassroots organizations more likely to emphasize the potential for additional benefits of workforce development and housing affordability, as well as threats of displacement of current residents.

The variety of opportunities and threats posed by green infrastructure increases the potential of projects to support the development of social capital, including the building of relationships, trust, and networks of communication. The next chapter examines the ways in which green infrastructure and associated planning processes have supported the development of these elements.

CHAPTER 8. HOW GREEN INFRASTRUCTURE REINFORCES SOCIAL CAPITAL

Several works examined as part of the literature review for this study argued that green infrastructure presents an opportunity for the development of social capital (see Figure 28). In particular, green infrastructure investment may support social capital development through activities and social interaction surrounding existing green spaces (Tidball and Krasny, 2009, Colding and Barthel, 2011); active participation in the planning and management of green infrastructure (Tidball and Krasny, 2009); advocacy and civic action surrounding environmental justice threats and access to environmental goods (Anguelovski, 2015); and advocacy surrounding issues of social equity and gentrification surrounding green investment (Curran and Hamilton, 2012, Anguelovski, 2016). In this chapter, I examine whether and how green infrastructure planning supported the development of social and intellectual capital in the case neighborhoods, as well as mediating factors impacting whether or not green infrastructure served as a catalyst in these areas.

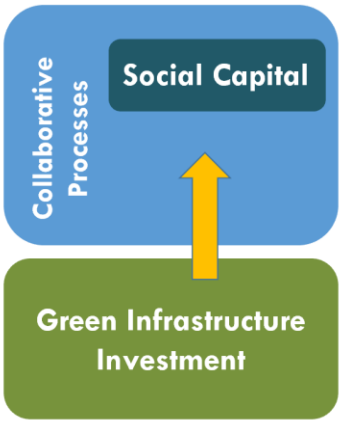


Figure 28: Green infrastructure reinforces social capital

Along with chapter 7, this chapter addresses the research question *How does green infrastructure shape the development of social capital?* In particular, this chapter responds to Hypothesis 1: *Green infrastructure planning processes increase social capital amongst neighborhood residents and stakeholders,* and Hypothesis 2: *The planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that lead to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.* In this way, it discusses the development of social capital both within and outside of green infrastructure planning processes.

In evaluating these hypotheses, the chapter examines the development of social capital within and outside of green infrastructure planning processes through the development of relationships and trust, the building of networks of communication, and the development of intellectual capital.

As described in the literature review and the section on operationalizing key concepts, I define social capital development to include the building of relationships and trust, behavioral norms, and networks of communication (Putnam, 1995, Innes, Gruber, Neuman, and Thompson, 1994, Woolcock, 2004). I define the development of intellectual capital as including knowledge sharing and mutual learning, which occur when groups with different sets of knowledge come into contact, share information, and expand each other's perspectives (Lejano and Ingram, 2009).

The unique combination of potential benefits and threats associated with green infrastructure projects has led to the development of social and intellectual capital surrounding green infrastructure projects and their impacts to varying extents. A few projects in the study areas held in-depth planning processes that led to the building of social capital through the development of trust, relationships, and networks, and high levels of knowledge sharing and mutual learning. However, the extent to which these forms of capital have been developed in these processes has depended on additional factors, including the quality and flexibility of project planning processes, the extent to which concerns raised by the community during planning processes were prioritized in implementation, and project scale and length of implementation.

In Atlanta, of the ten projects and one vision plan effort that had been recently completed or were in the process of being planned and developed, three of the projects and the vision plan effort supported extensive, in-depth community engagement efforts that spanned one or more years and provided opportunities for the development of social capital through building of relationships, trust, and networks of communication, and supporting high levels of knowledge sharing.

These include the Atlanta Beltline project, which initially supported high levels of community engagement around the project's implementation. Engagement of a variety of interest groups in initial planning efforts led to the inclusion of goals for housing affordability in plan documents, including the development of 5,600 affordable units. However, implementation of this goal has been slow, with the project directly supporting the development of 901 units within its Tax Allocation District from 2005 to 2018 (Atlanta Beltline, Inc., 2018). For this reason, social capital developed around the project has shifted from a focus on the project's implementation to supporting housing affordability and resisting gentrification and displacement of existing residents.

Another Atlanta project that supported the development of social capital is the Proctor Creek North Avenue Green Infrastructure Vision, a green infrastructure plan for the English Avenue, Vine City, and Atlanta University Center neighborhoods, led by the nonprofit Park Pride. The planning process took place from January to December 2010 and included six public meetings and 12 steering committee meetings that had high levels of participation.

Finally, the planning processes for Lindsey Street Park and Kathryn Johnston Memorial Park, small-scale neighborhood parks that were developed as part of the nonprofit Conservation Fund's Parks with Purpose program, supported the development of social capital through extensive community engagement efforts. The planning processes for these parks took place over multiple years and provided opportunities for in-depth knowledge sharing and mutual learning around green infrastructure project design as well as outside concerns such as jobs and workforce development, and issues of race, power, and privilege.

In Washington, D.C., one project of the seven major projects that had recently been developed or was in the planning or implementation process in the case neighborhoods, supported high levels of social capital development in these ways. Specifically, planning for the 11th Street Bridge Park project, led by the nonprofit organization Building Bridges Across the River, supported high levels of community participation, network building, and knowledge sharing in the planning process and implementation of its Equitable Development Plan.

While the planning processes surrounding these projects have often presented opportunities for the development of social capital, coalitions have also formed outside of project planning processes to focus on the impacts of green infrastructure. Advocacy efforts have also formed in response to projects not fulfilling goals developed around housing affordability and community benefits. The development of social and intellectual capital is discussed in this chapter, while chapter 5 focuses on the development of political capital and advocacy.

8.1 Social Capital Development

Green infrastructure projects have served as opportunities for the development of social capital, including the building of relationships, trust, behavioral norms, and networks of communication (Putnam, 1995, Innes, Gruber, Neuman, and Thompson, 1994, Woolcock, 2004). This section explores whether these potential impacts of green infrastructure were evidenced in the Atlanta and Washington, D.C. cases.

8.1.1 Building of Relationships, Trust, and Behavioral Norms

In the case neighborhoods, green infrastructure planning processes often operated within environments in which residents expressed low levels of trust in planning processes. Interviewees described high levels of distrust in the case neighborhoods, which have been 'over-planned' and studied but had not witnessed a high degree of implementation of planning efforts. As one non-profit leader noted, this distrust is "totally deserved given the past history and that these communities have seen a lot of people parachute in and take the money and run with no real change on the ground."

In this environment of considerable distrust of planning initiatives, green infrastructure planning efforts either reinforced distrust or built new trust and relationships within communities. Residents, non-profit leaders, and planners described both process and outcome-focused components that supported the building of relationships and trust among residents, stakeholders, and project leadership during planning processes. With regard to planning processes, interviewees noted that relationships and trust were built when projects supported in-depth community engagement processes, community control and leadership, and when processes were flexible in their ability to focus on residents' concerns discussed in planning processes. Outcomes-focused aspects of planning included the putting forward of high levels of effort and resources to address community concerns noted during project planning processes. In contrast, planning processes that did not engage in these trust- and relationship-building efforts often reinforced distrust in communities.

8.1.1.1 Quality and Flexibility of Community Engagement

Relationships, trust, and behavioral norms between non-profit organizations, government agencies, planners, residents, and stakeholders were built to the greatest extent

in projects that had extensive community engagement processes and supported community leadership and control. Projects which held extensive, in-depth community engagement processes, which supported community leadership, and in which leadership was flexible in planning processes allowed for greater levels of trust-building and knowledge sharing with neighborhood residents surrounding project impacts.

In the neighborhoods with the most extensive community engagement processes, non-profits leading the projects spent multiple years building relationships with residents and stakeholders and discussing the impacts of park projects. For example, in Atlanta, the non-profit organizations The Conservation Fund led a three-year planning process for Lindsey Street Park from 2012 to 2015, covering topics such as race, power, and privilege, in addition to park design and other concerns about the park's impacts. The process included a trip to Milwaukee, sponsored by a local foundation, in which neighborhood residents learned about green infrastructure design and techniques that could be used in Atlanta. Following the trip, the non-profit's leadership recognized that that they still lacked the expertise to fully engage with neighborhood residents around project impacts. The group then partnered with Resourceful Communities, a non-profit organization based in North Carolina, to host trainings with stakeholders and residents over a two-year period on topics such as race, power, and privilege. As one non-profit staff member described,

> "We started with this really big, really uncomfortable topic, and it built so much trust for us with the community members because they saw that we were trying to do this differently. That we were trying to be honest about what the real impacts on these communities are, and that is not just "build a park and make it better." This is admitting that there are literally centuries of underlying concerns. That these neighborhoods didn't get this way overnight. That this has been built into the history of America through systemic racism and oppression."

This thorough level of community engagement surrounding green infrastructure planning, including discussions of topics outside of typical green infrastructure or park design concerns, allowed for the building of relationships and trust with community members. Interviewees involved in the planning process described the transformation of some residents' deep distrust into demands for other planning processes to utilize similar levels of collaboration and community engagement.

In contrast, green infrastructure planning processes that implemented minimal community engagement exacerbated existing distrust in communities and led to the development of projects that did not meet community needs. For example, neighborhood groups described the development of the Proctor Creek Greenway in Atlanta as an example of a project that did not provide sufficient opportunities for community engagement with residents of the neighborhoods the trail passes through. Rather, the city's Office of Resilience presented plans for the greenway to Grove Park neighborhood residents after they had been developed. As a result, plans for the project did not include a point of access for the Grove Park neighborhood. As one Grove Park resident described,

> "They came and had a community engagement meeting. It was in last year, like August or September, at the food bank, the community food bank. They were 90 percent done. That's when they presented to the neighborhood...Our former president was present. I was at the meeting, as a very involved community member. [Our former president], at the time, you know what she said? "Well, how does the Grove Park neighborhood get in?" "Oh, oops.""

Plans for a 'spur trail' to provide an access point were eventually added after protests from neighborhood groups, but the construction of the access point is expected to take about two years. As the Grove Park resident described,

> "They did, I call it a handyman special access point…Like if someone comes in and do a half-assed job or something, right, it's a handyman special…Like if…you get a shade tree mechanic, someone that "I need to get my oil changed," and he rolls your car under a tree and changes your oil, but he forgets to put the screw in. That type of half-assed job. So now, once…the Office of Resilience, because they're the ones that kinda spearheaded the project, once they got all the feedback and then realized the neighborhood was pissed off, and I pretty much told [their leader], "You guys kinda dicked the neighborhood." It's pretty much what you did was say forget about the poor Black people. Let's get to the middle-class, higher-income people at the West Highlands neighborhood. Let's give them direct [access to the greenway]."

In this way, a lack of community engagement and associated failures to address community needs increased distrust with neighborhood residents, including a sense that projects were not built for residents of lower-income neighborhoods.

8.1.1.2 Community Leadership and Control

In addition to high levels of community engagement, community leadership and control in planning processes was central to building trust in project planning efforts. The 11th Street Bridge Park equitable development planning process led to the creation of the Douglass Community Land Trust, in which residents made up two thirds of the advisory committee. Members of the committee described the building of trust as residents led decision-making. Specifically, the early phases of the land trust involved decision-making surrounding which income levels the land trust would target. Members of the committee decided that it was important to "preserve Anacostia and the surrounding area for the households and communities that are there now," meaning that the group would aim to serve the households at the income levels of current residents, below $30,000 in household income per year. The focus on serving the lowest income residents means that the land trust will focus on rental housing in addition to homeownership. This model of decision-

making led by neighborhood residents was described as important in building trust among residents. As one advisory committee member noted,

> "I think there's been a lot of experience in Anacostia and other communities to say, oh well, you want this. Too bad. We can't do that because of all of these reasons that you don't understand because we're the technocrats. I think avoiding that trip was a signal that there was going to be actual shared decision making instead of just 'community input' that was empty. It was actually the members of the committee making this very important and foundational decision about what the goal of the land trust would be."

Trust and relationships were also supported when organizations leading the development of green infrastructure projects were community organizations with a track record of working within the communities in which the projects were based. The 11th Street Bridge Park planning process is based in the non-profit organization Building Bridges Across the River, which has been working in the Congress Heights neighborhood, located nearby the Bridge Park, for more than 12 years as a community center with a medical clinic, an arts program, a school, and a Boys and Girls Club. More recently, the organization added a large urban farm in the Congress Heights neighborhood and a workforce development center. The previous work of the organization in the neighborhoods surrounding the park project allowed it to leverage its existing relationships with community residents and organizations and has provided a foundation of trust upon which the 11th Street Bridge Park project was able to be based.

In contrast, planning processes which did not support community leadership and control in green infrastructure planning processes increased distrust by creating a sense that planning efforts were more informational and that residents would not be able to shape outcomes. As one Westside neighborhood resident described regarding green infrastructure planning processes,

> "The average person does not have that ability [to shape projects or policy] because the way the process works is if there is an initiative or idea, whether it's the Atlanta Regional Commission or the City of Atlanta, they're gonna hold up the three community engagement meetings. And they're gonna tell folks what they want them to know. The purpose on the end of the planner is to make sure that it has been properly advertised and that whoever comes in the room signs up on the sign in sheet."

This lack of community leadership and control in planning processes increased distrust and contributed to a sense of fatigue with planning processes.

8.1.1.3 Prioritization of Concerns Discussed in Planning Processes

Finally, with regard to project outcomes, green infrastructure planning efforts in which leadership recognized community concerns during planning processes and put forth high levels of effort and resources to address them built higher levels of trust within communities. The prioritization of residents' concerns through acquiring and devoting resources and staff and building partnerships with outside organizations and funders supported the building of trust and relationships with residents and stakeholders. As one resident who participated in the 11th Street Bridge Park planning process described,

> "I came to [the 11th Street Bridge Park project] as a skeptic, that it seems like the idea of creating this bridge is a cool design problem in and of itself, but then, this other idea behind it of the more metaphoric bridging of communities that they talk about and bringing people together. That, to me, sounded a little bit more abstract and felt more like a thesis project than something that would materially be realized. Then I saw the amount of effort and the resources that were being put towards this equitable development package and plan and seeing that there was essentially more money going into the soft impact of the project, which was actually the things that are going to impact people more than there actually being a beautiful park and beautiful bridge there. It's the workforce development, the homebuyers' clubs, the work we're doing with the community land trust, and all of these other things are the things that are actually going to impact the community and create space where they're not going to be, hopefully, vast disparities that there are from one side of the river to the other. That's what really drew me in was the concerted effort to actually do all the warm, fuzzy stuff that they talk about the bridge will actually do."

In contrast, a lack of focus on and effort to implement areas identified by residents as important has increased distrust and feelings of distrust in planning efforts. The Atlanta Beltline provides an example of a project that initially built high levels of grassroots support but lost trust over time because of its lack of focus on and effort in implementing goals such as affordable housing production that were identified as important to residents in initial planning efforts. The project's initial planning process resulted in a goal of the creation of 5,600 affordable housing units within the project's Tax Allocation District area; however, the project has received significant criticism for its lack of focus on affordable housing, both during planning processes and in implementation efforts (e.g., Mariano, Conway, and Ondieki, 2017). In the Housing Justice League's report on the gentrification surrounding the Atlanta Beltline, one resident noted that the "Beltline has been holding meetings in communities for the design aspects [of the project]. But it's definitely focused on the green space part of it," and that he hadn't heard conversations surrounding "what type of businesses or homes" residents would like to see. In addition to a lack of focus on this area in project planning processes, the project is significantly behind in meeting its goals for affordable housing production, and its leadership neglected to tap available funding sources for affordable housing production early on in the project's implementation. This lack of implementation of the goals set during the project's initial phases has also increased distrust of the project. As one grassroots group leader described regarding the lack of implementation of goals identified in the project's Equitable Development Plan,

> "The Equitable Development Plan that was developed about five years ago through the leadership of the BeltLine Tax Allocation Advisory Committee (TADAC) as well as BeltLine staff…really came from a sale of property, the purchase of property in a particular segment of the BeltLine. And folks were really beginning to get concerned about how those dollars were being used on the north side versus a more balanced approach…We push and get the council to actually require the

> development of an equitable development plan. So that equitable development plan was completed. You can find it online, but it was never ratified as an agreement, and the challenge with Atlanta is that we love plans, but we don't like to be held accountable for those plans, and so we develop community benefits plans but not community benefits agreements…of course the work around affordability is another place the BeltLine is falling short in terms of being sensitive to the needs, these issues of equity, and you can see that through this disproportionate investment in parks and trails versus the investments around housing affordability and other key things that would help them generate equitable outcomes for everybody."

Similarly, one Washington Park resident emphasized the lack of focus on residents' concerns during planning processes, as well as the lack of implementation of affordable housing goals, noting that,

> "The government's decided what they wanted to do at the end of the day. Along the lines people dropped the ball, and they decided that focusing on what was agreed about affordability, particularly on the Westside, at the beginning of the project and discussions about the project is not what they wanted to do, is not what they did."

In this way, a lack of prioritization of residents' goals discussed in planning processes led to increased distrust of green infrastructure planning efforts and a sense that decisions have already been made about project planning and implementation.

As described in this section, green infrastructure has served as an opportunity for the building of relationships and trust among stakeholders involved in green infrastructure planning processes. While the planning for some green infrastructure projects supported the development of relationships and trust at high level, other planning efforts increased distrust between project leadership and neighborhood residents. Relationships and trust were developed to the greatest extent when projects engaged in in-depth, flexible planning processes, supported opportunities for community leadership and control, and prioritized residents' concerns in implementation.

8.1.2 Building of Networks of Communication

Green infrastructure project planning processes also created the opportunity to support the building of new connections and networks. Green infrastructure planning in the case neighborhoods necessitated the building of networks to a certain extent because of the variety of interests attracted to projects, and the expertise, funding, and other resources required for project completion. However, a few projects extended their networks further to incorporate groups and organizations working in a variety of areas of concern to neighborhood residents, including groups with skills in affordable housing development and workforce development. Outside of project planning efforts, neighborhood groups formed new networks and connections focused on the opportunities and threats associated with the development of green infrastructure in their neighborhoods.

8.1.2.1 Attraction of a Variety of Interests and Requirements for Funding and Expertise in Project Planning

The planning and implementation of green infrastructure projects supported the building of networks and connections with a variety of stakeholders. As stakeholders and residents associated green infrastructure projects with a variety of benefits and threats, the projects tended to attract stakeholders with a variety of interests, including environmental, economic, and social concerns. Projects in the case neighborhoods brought together groups and individuals with a range of interests including environmental quality, stormwater management, park access, community revitalization, economic development, workforce development, housing, and public health, among others. For example, as one planner involved with the Atlanta Beltline project described,

> "[The Atlanta Beltline] really became much bigger than we imagined. That's about the time that the Trust for Public Land came in and said, "What about 1,400 acres of new parks?" Mayor Franklin said, "What about 5,600 units of affordable housing?" Trees Atlanta came in later with this idea of an arboretum. The idea is the Beltline itself becomes a framework for people's ideas. Still, today, the farmer's market people are trying to put farmer's markets around it."

In this way, the ability of green infrastructure projects to attract interest groups focused on a variety of concerns makes projects unique in their ability to support networks of communication among diverse stakeholders.

Further, the expertise and funding required for project completion often requires collaboration among a variety of government, nonprofit, and private entities. In both Atlanta and Washington, DC, green infrastructure projects- particularly those with high levels of community engagement-- often involved a combination of government agencies, nonprofit and grassroots groups, community stakeholders, and technical consultants, which contributed project funding, local or technical knowledge and expertise, or leadership to project planning efforts. For example, Lindsey Street Park in Atlanta used funding from Atlanta Parks and Recreation, Invest Atlanta (the city's economic development agency), Park Pride (nonprofit), the UHaul corporation, the MeadWestvaco corporation, the Arthur Blank Family Foundation, The Waterfall Foundation, the deForest Charitable Trust, and an anonymous grant through the Community Foundation for Greater Atlanta.

8.1.2.2 Willingness to Cross Boundaries and Prioritization of Boundary-Crossing Concerns

In addition to funders, stakeholders, and technical experts brought together for project design and implementation, a few projects expanded their networks further to address concerns brought up in project planning efforts outside of those typically thought

of as related to green infrastructure, such as workforce development and housing affordability. Network expansion in this way, while uncommon, did occur in a few projects. In particular, planning processes for the 11th Street Bridge Park and for the parks in the Conservation Fund's "Parks with Purpose" program (Lindsey Street Park and Kathryn Johnston Memorial Park) led to connections between the park groups and other organizations already working in the neighborhoods on housing affordability, workforce development, and/or small business development.

The 11th Street Bridge Park, in particular, provides an example of a project that expanded its network to encompass organizations and funders focused on goals outside of green infrastructure design and implementation. The park's equitable development planning process led to the development of goals for housing affordability, workforce development, and small business development. In an effort to implement these goals, the park's leadership hired an Equitable Development Manager who focused on achieving the plan's goals in large part through building relationships with existing organizations with skills, expertise, and resources to devote to the areas of concern identified by residents during the planning process. In most cases, groups had been working independently prior to the new connections made within the project. Building Bridges Across the River used the project and the results of its equitable development planning process to attract other organizations and the resources they could bring to the project. As one staff member described regarding the park's connections to housing, workforce development, and other organizations and funders,

> "I think from the start this project has always been about how listening to the community and in helping the community to implement the ideas and the programming that they believe they need in their community. And so I think what

> has happened is we have been able to use that as a leverage point as we do work with some of these other organizations, to say, 'these are the things the community is saying they want, and we have this great project where we can implement a number of these things. How about we all work together so that we can get the community what they, what the community says it wants. So I think it's ultimately just been us trying to be a convener, a connector between people and resources, organizations and resources, so that ultimately the community wins."

In this way, park leadership's willingness to cross boundaries to focus planning efforts on issues outside of green infrastructure project design and to prioritize these issues in implementation supported the development of new connections among organizations that had been working independently in a variety of areas.

The Conservation Fund's Parks with Purpose program, while at a smaller scale, provides an additional example of a green infrastructure project that catalyzed the formation of networks among actors. In the case of Lindsay Street Park, in particular, project leadership emphasized the importance of knowledge sharing on a wide range of topics, including issues of race, power, and privilege. These flexible planning processes allowed for the crossing of boundaries to include topics outside of green infrastructure project design. In particular, residents emphasized the importance of jobs and workforce development during these planning processes. The willingness of project leadership to prioritize these boundary crossing concerns led to the formation of additional networks and connections with organizations and funders focused on issues outside of green infrastructure project design and implementation. Specifically, the Conservation Fund formed connections with the Greening Youth Foundation, a workforce development non-profit, and the UHaul corporation in order to fund and implement a jobs and workforce development component as part of the implementation of Lindsay Street Park.

8.1.2.3 Capitalizing on Existing Skills and Resources in the Community to Address Goals Outside of Green Infrastructure Implementation

Interviewees noted the importance of connecting to outside organizations to capitalize on skills and resources already existing in their communities, avoid duplicating expertise, increase the profile of projects, and seek grants and resources with additional partners. Other organizations had skills and expertise in areas such as housing affordability and workforce development, which organizations and agencies focused on parks and green infrastructure generally lacked. Many of these connections were formed slowly as project leadership made connections with new organizations through a 'snowball' process. As one nonprofit staff member noted,

> "One of my first initiatives is really shoring up our workforce development plan and finding organizations who are already doing things in the community because one of the things we didn't want to do is reinvent the wheel. So it's really just about finding out what different workforce development organizations are already in the community and the work that they were doing, what are some of the gaps, and how could we partner with them on, help to try to fill some of those gaps? One of the first things I really learned was that a lot of these organizations you couldn't necessarily find online. You had to learn a lot about them from word of mouth. So I would go in to talk to one organization, and they would say 'hey, have you talked to you know x, y, and z organization?', and I'm like 'no, do you have a contact?' And they would give it to me."

By connecting with workforce development organizations and the government agency leading the park's construction, the group could determine which jobs would be available as part of the park's construction and which skills they would require. Workforce development groups could then provide training opportunities to support residents in acquiring the available jobs.

Another non-profit staff member involved in the park's land trust effort described the development of networks and connections as a way to reduce risk and speed up efforts before competencies could be developed within the organization. He emphasized the importance of partnering with organizations

> "that have good reputation and track records, so that we don't have to do as a nascent organization, take on the operational risk of real estate development, on top of all these other complicated things we're doing. I think there's an evolutionary approach to that. The land trust will mature, where these activities will grow in house, but…there's a premium on timing and that means trying to really invest in robust partnerships as much as possible and lean on those, rather than trying to recreate established competencies."

In this way, the desire to address a variety of issues outside of green infrastructure design and implementation incentivized organizations to seek out additional partnerships with community organizations skilled in these areas.

8.1.2.4 Building Networks to Support Advocacy around Benefits and Threats

Outside of project planning efforts, the potential opportunities and threats associated with green infrastructure has led to the formation of groups and coalitions focused on maximizing benefits for neighborhoods and addressing threats of displacement. Many of these groups have emerged out of a desire to advocate for green infrastructure and the cleanup of impaired waterways, while also ensuring that neighborhood residents benefit from new development coming into their neighborhoods surrounding new investments in parks, green infrastructure, and other amenities. Some of these coalitions are focused primarily on the impacts of green projects relating to housing affordability and community benefits. In Washington, D.C., the Anacostia Park and Community Collaborative, a coalition of 25 organizations and agencies, formed in 2015 to support the restoration of the

Anacostia River, the development of parks and green infrastructure along the river, and healthy and stable communities surrounding the parks and river, including addressing housing and workforce development concerns. The group has aimed to provide opportunities for collaboration and knowledge sharing between environmentally and socially focused organizations and agencies.

In Atlanta, the Proctor Creek Stewardship Council and the Watershed Learning Network League have focused on training community members as advocates surrounding the potential benefits and threats associated with green infrastructure, and on providing opportunities for collaboration surrounding green infrastructure issues, including housing affordability and workforce development concerns, as well as more traditional environmental concerns, such as flooding, combined sewer overflows, and water quality.

The Proctor Creek Stewardship Council was formed in 2014 as a variety of new investment in green infrastructure and development was coming to Atlanta's Westside neighborhoods, in order to develop the capacity of residents as stewards of the watershed. As one grassroots nonprofit leader described,

> "other agencies, other stakeholders have interest in the watershed, okay? But the people that really live there, at that time, we didn't have a body, a space where they feel comfortable to be able to share their thoughts and then get support for moving it forward."

Interviewees noted the need to both advocate for the benefits of green infrastructure and the right of residents "to benefit from developments in and around the watershed."

Grassroots nonprofit leaders developed Atlanta's Watershed Learning Network, in order to create, as one grassroots organization leader described, "an organic way of

growing stewards from the watershed that can stand and speak for their rights for clean water on one hand, and also to benefit from developments in and around the watershed." The program, which has graduated two cohorts of residents from three Atlanta watersheds, consists of six training modules on topics such as watershed ecology, community organizing, watershed management policy, water quality monitoring, and gentrification and displacement concerns. Graduates of the program are required to complete a project to benefit their watershed, and residents have taken actions from developing green infrastructure jobs training programs to creating educational curriculums for youth.

As described in this section, green infrastructure has served as an opportunity for the development of new networks of communication among stakeholders with a variety of interests, skills and expertise, and resources. While the planning for most green infrastructure supported the involvement of neighborhood residents, stakeholders with a variety of interests, government agencies, technical experts, and project funders in at least a limited way, some projects supported the development of a much wider variety of new connections with groups with a range of interests, skills and expertise, in areas not typically associated with green infrastructure planning, such as housing affordability and workforce development. Connections with these groups were typically sought out when projects engaged in in-depth planning processes that involved high levels of knowledge-sharing surrounding the potential benefits and threats posed by green infrastructure projects, and when project leadership prioritized the goals developed by residents during these in-depth processes by devoting time and resources to their implementation.

8.1.3 Intellectual Capital Development

Green infrastructure planning also supported the development of intellectual capital, both within project planning processes and outside of those processes. The development of intellectual capital included knowledge-sharing and mutual learning among residents and stakeholders, which included both local, neighborhood-specific knowledge and technical knowledge. The development of intellectual capital in green infrastructure planning processes was driven by the need for community input on public spaces; the need for technical knowledge in planning processes; the existence of concerns outside of green infrastructure project design; and the need for community leadership on environmental challenges.

8.1.3.1 Need for Community Input on Public Spaces

At a basic level, projects engaged residents and stakeholders in order to understand their desires with regard to park design. As green infrastructure projects are located in the public realm, they generally rely on public participation processes in order to gain input from residents on the design of projects and the amenities included. Project planning processes allowed for knowledge sharing and mutual learning surrounding identifying elements that were desired by residents, those that were unwanted, and potential designs to incorporate desired elements. Participants in planning processes provided feedback on a wide range of design elements and amenities, including stormwater management features, walking trails, playgrounds and exercise equipment, splash pads, picnic areas, monuments, and civic spaces such as amphitheaters. These processes involved sharing knowledge surrounding neighborhood concerns such as the location and extent of flooding and the health concerns associated with it, as well as neighborhood needs, such as community

gathering spaces and places for youth to play. As one government agency employee noted regarding the addition of a splash pad feature to plans for Cook Park in Atlanta,

> "[The park] was going to be this big formal thing with monuments and fountains, and so many people wanted a water feature that they can play in, their kids can play in. And so, they add a splash pad for that reason. And there's a lot of houses that don't have air conditioning around there in the summertime, so they need a way to cool off."

In this way, the need for community input on public spaces supported the development of intellectual capital by supporting knowledge sharing around community needs and desires regarding project design and amenities.

8.1.3.2 Need for Technical Knowledge in Decision-Making Processes

Planning processes surrounding park design also involved the sharing of technical knowledge, including education surrounding green infrastructure methods and wealth-building and anti-displacement techniques. Technical experts were included in planning processes to provide expertise on the green infrastructure design and installation. In planning efforts with the most in-depth community engagement, the inclusion of technical experts in planning processes resulted in knowledge sharing with residents and stakeholders around green infrastructure project design. As one park nonprofit staff member described regarding the planning for Lindsay Street Park in Atlanta,

> "All of us just looking at the site and drawing pretty pictures is great, but to have real green infrastructure, you've got to do some geo-technical work. You've got to have core sampling. You've got to know what really percolates, where you can store this water. So, it's really some significant engineering to these projects. So, we…hired [an] engineering firm, and then we brought them to the table with the community members, which is not something engineering firms normally do. They're normally pretty hands-off with community. So, we made it clear that that was part of the process. They were great. They were eager to participate in that. They came to the design meetings. They laid out, "Here are the options. These are

> our restrictions. This is what we can do. This is what we can't," and allowed the community to really take the time they needed to understand why some of the things they wanted may not be able to happen exactly how they want them. And what were the other options? We took those two initial concepts, went through that process, and ended up with our plan that the community supported."

Further, planning efforts for the park involved taking residents on a trip to Milwaukee, Wisconsin, to see how the city has implemented green infrastructure and to provide a basis for discussions during the park's 2-year planning process. In this way, the need for technical knowledge in decision-making supported the development of intellectual capital among residents, stakeholders, and technical experts in green infrastructure planning processes.

8.1.3.3 Existence of Neighborhood Concerns Falling Outside of Green Infrastructure Project Design

The existence of community concerns falling outside of green infrastructure project design and amenities also supported the development of intellectual capital in planning processes. Outside of project design, residents shared information during planning processes surrounding concerns for project impacts, including the need to focus on maintaining housing affordability, as well as to focus on community wealth building strategies. As one park nonprofit leader described,

> "When we first started talking about building a park, the community, they were like, "Okay, that's great, but parks are not our big concern. We need jobs." So really, that was the catalyst of the community. They were insistent about talking about jobs."

In this way, residents' sharing of concerns outside of green infrastructure project design served as a catalyst for knowledge sharing around community needs such as jobs, workforce development, and housing affordability. As will be discussed in the next chapter,

there were a few occasions in the case neighborhoods in which knowledge sharing surrounding the project impacts led to incorporation of these concerns into projects and these planning efforts.

8.1.3.4 Need for Community Leadership on Environmental Challenges

Outside of project planning efforts, coalitions focused on green infrastructure provided opportunities for knowledge sharing and mutual learning surrounding environmental challenges. Residents' concerns around environmental justice issues that had not been addressed by local governments or nonprofit organizations, and a need to ensure that residents' voices were heard in planning processes catalyzed the formation of coalitions focused on green infrastructure, including the Atlanta Watershed Learning Network, the Proctor Creek Stewardship Council, and the Anacostia Park and Community Collaborative. In particular, the Atlanta Watershed Learning Network provided opportunities for individuals and stakeholder groups working in different watersheds to come together to discuss the issues occurring in their watershed and efforts to address them. As one nonprofit leader described,

> "I think a lot of time, residents think that these impacts, these combined sewer systems, this flooding, is only happening in their communities. When you can get out and see that this impacts others, then you start building a network of support, and you understand each other's challenges, and lessons learned, and successes."

These coalitions also allowed for educational opportunities for residents focusing on issues such as watershed management policy, water quality monitoring, environmental justice, and gentrification.

8.2 The Importance of Project Scale and Length of Implementation

A few mediating factors shaped the potential for projects to support the development of social capital, including the length and quality of community engagement, and project scale and length of implementation.

Projects in the case neighborhoods varied with regard to scale and length of implementation. Small to medium-scale projects have taken less time for planning and implementation, while the Atlanta Beltline, a large-scale citywide project that includes a transit component, has estimated a 25-year planning and implementation process, which began in 2005 and the completion of which is expected in 2030. The scale and length of project implementation has shaped the development of social capital over time, with early social capital focused on making the project a reality, while social capital developed later focused on the project's failure to meet its goals surrounding housing affordability. While small to medium-scale projects have required less extensive social capital from planning to completion with regard to ensuring projects meet community needs, the long planning and implementation process associated with large-scale projects such as the Beltline may require years of community effort to ensure the projects maintain a focus on goals set during initial planning processes.

The Atlanta Beltline project built social capital to a large extent during early grassroots advocacy efforts to get buy-in from city and regional agencies to make the project a reality. As one of the project's early leaders described, large groups of citizens flooded early planning meetings to get the Beltline on the Atlanta Regional Commissions list of transportation projects. The popularity of the project shaped the city's elections:

> "In 2009 when Mayor Reed was first elected…in that election you couldn't be a viable candidate without supporting the project and having some plan for how you were going to do it better and faster."

While initial support for the project was high, this decreased over time because the project failed to prioritize affordable housing goals. As early as 2007-2008, professor Dan Immergluck and the project's Tax Allocation District Advisory Committee warned of increasing housing costs and displacement of existing residents as a major threat (Mariano, Conway, and Ondieki, 2017). Project management did not prioritize the construction of 5,600 affordable units in its Tax Allocation District (established in the legislation creating the TAD). Rather, leadership focused primarily on funding the development of the trail itself (Immergluck and Balen, 2017). The financial crisis of 2008 led to challenges in issuing bonds, 15 percent of the proceeds of which were slated to go toward the project's Affordable Housing Trust Fund. From 2006 to 2014, the project subsidized only 256 affordable units of the initial 5,600 goal for the development of affordable units within the project's Tax Allocation District (Immergluck and Balen, 2017).

In response, social capital has developed surrounding the increasing threat of gentrification and displacement. Community groups and coalitions such as the Housing Justice League have advocated for the project to meet its affordable housing goals and for development of policies and strategies to address housing affordability, gentrification, and displacement concerns. In addition, two prominent board members of the Atlanta Beltline Partnership--the project's creator, Ryan Gravel, and Partnership for Southern Equity director Nathaniel Smith—resigned from the project's board in 2016 over the project's failure to prioritize affordable housing.

Small- to medium-scale projects in the case neighborhoods have had planning and implementation processes that have occurred over multiple years, but none have matched the scale and length of implementation of the Atlanta Beltline. The large scale of the Beltline project and its associated 25-year planning and implementation period have led to a shift in the focus of social capital from project implementation to prioritization of goals for affordable housing development. The length of the project's planning and implementation creates a need for social capital to be developed and maintained over the long term in order to ensure that the Beltline achieves its goals surrounding affordable housing development.

8.3 Discussion

This chapter examined how green infrastructure reinforces social capital through supporting the development of relationships and trust, the building of networks of communication, and the development of intellectual capital. The evidence presented in this chapter addresses Hypothesis 1: *Green infrastructure planning processes increase social capital amongst neighborhood residents and stakeholders,* and Hypothesis 2: *The planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that lead to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.*

Regarding Hypothesis 1, the research demonstrates that social capital was developed to the greatest extent within green infrastructure planning processes with specific characteristics. Specifically, relationships and trust were supported by planning

processes with in-depth, flexible community engagement; opportunities for community leadership and control; and the prioritization of concerns discussed in planning processes. The development of networks of communication was supported by the attraction of a variety of interests to green infrastructure projects and planning processes and requirements for funding and expertise for project implementation, as well as the willingness of project leadership to cross boundaries and prioritize boundary-crossing concerns and the need to capitalize on existing skills and resources within communities to address boundary-crossing issues. In addition to developing social capital, green infrastructure planning also supported the development of intellectual capital through the need for community input on public spaces; the need for technical knowledge in decision-making processes; and the existence of neighborhood concerns falling outside of green infrastructure project design.

As evidenced by the research, only a few projects within the case cities engaged in extensive community engagement processes that supported the development of social capital. Projects such as the 11th Street Bridge Park and the Conservation Fund's Parks with Purpose program supported the building of relationships and trust, networks of communication, and intellectual capital. In contrast to processes with higher levels of community engagement, other projects, such as the Proctor Creek Greenway, increased distrust through a lack of community engagement or a failure to prioritize concerns raised by communities during planning processes.

Even in projects that initially supported high levels of social capital, such as the Atlanta Beltline, a failure to prioritize and implement residents' goals outside of green infrastructure project design led to increased distrust. The Atlanta BeltLine project

initially had many of the characteristics of processes with high levels of social capital around the project's implementation; yet, the project's large scale and long implementation timeline led social capital around the project to shift toward advocacy surrounding housing affordability and community benefits. While the Atlanta Beltline and the 11th Street Bridge Park both supported connections between large networks of actors in a variety of areas of interest, the 11th Street Bridge Park project has prioritized concerns raised by residents in planning processes to a greater extent, thus building additional social capital through the development of relationships and trust and the prioritization of concerns raised by residents in planning processes.

Regarding Hypothesis 2, the research demonstrates that the opportunities and threats associated with green infrastructure catalyzed coalition building and knowledge focused on the impacts of projects, including issues of housing affordability and community benefits. Outside of green infrastructure planning processes, the building of networks of communication was driven by the multiple benefits and threats associated with green infrastructure, with organizations such as the Atlanta Watershed Learning Network, the Proctor Creek Stewardship Council, and the Anacostia Parks and Community Collaborative forming with the goal of maximizing the benefits associated with projects while minimizing threats related to gentrification and displacement. Further, the need for community leadership on green infrastructure challenges supported the development of intellectual capital by catalyzing the formation of these organizations devoted to knowledge sharing surrounding environmental justice threats and the benefits of green infrastructure.

CHAPTER 9. THE ROLE OF SOCIAL CAPITAL IN SHAPING GREEN INFRASTRUCTURE PROJECTS AND PLANNING PROCESSES

The previous chapters examined the opportunities and threats posed by green infrastructure in low-income communities and how these, in combination with green infrastructure planning processes, can support the development of social capital surrounding green infrastructure planning and implementation. The social capital formed around green infrastructure projects and planning processes may also in turn shape green infrastructure projects and planning processes to further incorporate residents' concerns and increase projects' focus on issues of social equity. Social capital may shape green infrastructure projects themselves, lead to the expansion of green infrastructure planning processes, and support changes in organizations and agencies leading green infrastructure projects and planning processes (see Figure 29).

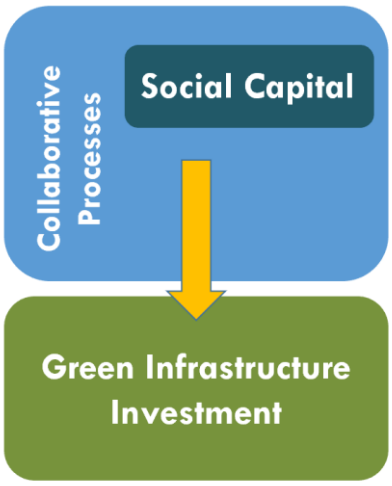


Figure 29: Social capital shapes green infrastructure investment

Along with Chapter 10, this chapter addresses the research question *How does social capital shape green infrastructure planning and equitable development?* This chapter discusses how social capital has shaped projects and their planning processes, and Chapter 10 examines how social capital has shaped the institutionalization of policies and strategies. In particular, this chapter responds to Hypothesis 3: *Increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these projects and their planning processes.*

In evaluating this hypothesis, section 9.1 examines how social capital shapes green infrastructure projects themselves; section 9.2 examines how social capital shapes green infrastructure planning processes; and section 9.3 examines how social capital can support organizational change. Finally, section 9.4 examines the limitations of social capital in shaping green infrastructure projects and their planning processes.

9.1 Shaping Green Infrastructure Projects

First, social capital developed around the opportunities and threats posed by green infrastructure projects and within green infrastructure planning processes shaped green infrastructure projects themselves, including shaping the design components and amenities included in projects.

In planning processes in which residents and stakeholders were engaged around green infrastructure design, they were able to shape the ways in which green infrastructure features were incorporated into projects. One nonprofit staff member described how

neighborhood residents shaped which green infrastructure techniques were used to absorb stormwater in Atlanta's Kathryn Johnston Memorial Park:

> "When we first started at Boone Park West [now renamed Kathryn Johnston Memorial Park]…we drew up a rendering. At this point, we had no community input because we had no dollars to do anything. So, we drew up a little map that had a big pond in the middle of the site because we were thinking green infrastructure. When we first started working with the community, we put that rendering up, and we said, 'we want to be very clear that is just a drawing that we put together to get some dollars in hand. We are not in any way attached to this plan.' The community said, 'great, because we do not want a pond in our neighborhood.'…One of the first steps we did was we took the members of the steering committee on a tour of green infrastructure all around town. We took them over to Dean Rusk Park where there's a beautiful pond. But it just happened, on the day that we went, there was a significant amount of litter floating in the pond. Our residents quickly said, 'We don't have canoes. We don't know how we're going to clean that out. We don't want a pond.' And then, I also know they're building Rodney Cook Park just down the street, which is going to have some significant amounts of ponds on site. So, I think they just really wanted something different on this site."

In response to these concerns, the park's master plan included plans for green infrastructure in the form of rain gardens, bioswales, and underground chambers, rather than in the form of a stormwater pond. In this way, social and intellectual capital developed in planning processes shaped how green infrastructure was included in projects, providing the opportunity for residents to directly shape the implementation of green infrastructure in their communities.

In addition to the type of green infrastructure used in projects, social capital developed in planning processes also shaped the amenities that were included. Residents and stakeholders advocated for the inclusion of amenities in green infrastructure projects to address a variety of interests and needs, including space for youth to play, community gathering spaces, performance and education facilities, and water features. One government agency staff member described how input from residents surrounding park

design in the planning process for Atlanta's Cook Park shaped the project to include a splash pad feature:

> "The kind of input that was gotten from the community, especially around park amenities, through some of the work the Trust for Public Land did I think has definitely impacted some of the amenities that they will and won't include in the park. For instance, a splash pad. I don't think that they initially, it was just going to be this big formal thing with monuments and fountains, and so many people wanted a water feature that they can play in, their kids can play in. And so, they add a splash pad for that reason, and there's a lot of houses that don't have air conditioning around there in the summertime, so they need a way to cool off."

In this way, design features often addressed critical social and economic needs in communities.

Projects which included more in-depth community engagement surrounding project design supported residents and stakeholders in shaping projects and their amenities to meet community interests and needs. Green infrastructure projects in the case study neighborhoods varied widely in their levels of engagement around green infrastructure project design and amenities. While most projects included at least some level of community engagement in this area, some project plans were presented to residents after their development, allowing only for the reactive shaping of projects and amenities. At the low end of the spectrum of community engagement, planning for the Proctor Creek Greenway, led by the City of Atlanta's Office of Resilience, did not engage the residents of the Grove Park neighborhood until plans for the trail were already developed. This lack of initial engagement led to the failure of the project's design to provide access to the Grove Park neighborhood, leading to push back from neighborhood residents and the eventual addition of a spur trail to the plan that would provide residents of the neighborhood with access to the amenity. In this example, rather than advocating for the inclusion of specific

amenities to address community needs, residents spent time and effort advocating instead for access to the greenway from their neighborhood. In contrast, at the high end of the community engagement spectrum, planning efforts for the 11th Street Bridge Park in Washington, D.C., included hundreds of community meetings in which project leadership asked neighborhood residents whether the project was something they would want in the community, and, if so, what design elements and amenities the project should include. As one nonprofit staff member associated with the project described,

> "We had a series of meetings with residents on both sides of the river, asking some simple but very important questions of is this something the community wants, first and foremost? And sort of asking for permission for this... And we heard lots of enthusiasm from that. Two, if the answer was yes, which it was, help us shape this project. So, help us make sure that the programing that is reflected on this new civic space, reflects the needs of the community. So, we've heard ideas like environmental education center, performance spaces, access to the river through kayak and canoe launches, public art that tells the rich history of the region, intergenerational play spaces, café and restaurant, large performance areas. That's actually the number one idea that the community asked for, so space that we can build social capital from both sides of the river through cultural arts programming." We had ... To give you a sense of scale, that took about two years and we had a little more than 200 meetings, again before we engaged any architects, or designers, or engineers."

In this way, the level of community engagement associated with green infrastructure projects shaped green infrastructure projects directly through driving project design and amenities.

9.2 Expanding of Green Infrastructure Planning Processes

In addition to shaping green infrastructure projects themselves, social capital also led to the expansion of green infrastructure planning processes to include issues outside of green infrastructure project design and amenities, such as workforce development and housing affordability. Leaders in multiple green infrastructure projects examined as part of

this study described concerns brought up by neighborhood residents and organizations that fell outside of the scope of parks and green infrastructure and were later incorporated into planning processes. Some groups leading green infrastructure planning processes were able to pivot their planning processes to address these concerns surrounding housing affordability and community benefits at varying levels. At the high end of the spectrum, Washington, D.C.'s 11th Street Bridge Park developed a separate planning process around equitable development after hearing residents' concerns in an initial planning process focused on the park's design. This plan focused on housing affordability, workforce development, and small business development is now in the process of implementation. At a smaller scale, the Conservation Fund in Atlanta added a jobs and workforce development component to its Parks with Purpose program after hearing concerns from residents in planning processes, including temporary jobs and training for four young adults in the construction of Lindsay Street Park. While these projects vary in the extent to which components focused on equitable development were incorporated, they illustrate the potential of social capital to extend green infrastructure planning to focus on the impacts of projects outside of project design and amenities, including issues of housing affordability and community benefits.

Extensive planning processes allowed for high levels of knowledge sharing among neighborhood residents, community organizations, and other stakeholders, and the formation of connections to a greater variety of stakeholder groups. Projects with the most extensive community engagement were more likely to expand planning processes to incorporate issues outside of green infrastructure project design, such as housing affordability and workforce development. Projects which expanded their planning

processes were also typically led by nonprofit organizations which had leadership committed to addressing community concerns and additional flexibility with regard to the length and focus of their projects. These organizations were also more easily able to partner with corporate sponsors to fund expanded planning processes and project goals. The following sections describe these components in greater depth.

9.2.1 Pressure from Residents and Community Groups

Interviewees who led green infrastructure planning processes often described planning processes that were initially design-focused, in which the group responsible for the project asked for input on how the park would look and which amenities should be included. Within these design-focused processes, residents frequently brought up additional concerns-- mainly economic and social in nature-- including housing affordability and the potential for increasing housing costs associated with new amenities to displace of existing residents, as well as the potential for projects to support goals surrounding workforce development, job creation, and small business development. One park nonprofit leader noted that in addition to addressing environmental concerns such as flooding, residents discussed the need for job creation:

> "With us doing a visioning plan with the community…we'll ask questions like, 'What do you want to see in your park?' and the response was, 'We want to deal with the flooding issue. We also want to address the jobs issue.'"

Another nonprofit leader described similar concerns associated with who would get the jobs associated with the park's construction:

> "When we were out there on those early hundreds of meetings, we were hearing lots of programming ideas, which is important to make sure…that this future park does meet the needs of those residents, but we also heard other things, right? We

> heard, ‘Well, who’s gonna build this park? How do we ensure that this park is for us?’”

Another described residents’ concerns associated with increased development and neighborhood change surrounding a proposed park:

> “A lot of folks had brought up concerns about the impact the park would have on the surrounding neighborhood, especially given the way neighborhoods, at least west of the Anacostia River, had been changing based on development.”

While these concerns were brought up during planning processes focused primarily on green infrastructure project design, they emphasize the potential impacts of green infrastructure projects on low-income communities both during and after their construction. Planning efforts with a combination of pressure from residents and community groups and high levels of knowledge sharing and community engagement were more likely to expand planning processes to incorporate concerns outside of green infrastructure design and amenities.

9.2.2 Knowledge Sharing and Community Engagement

Projects planning efforts with high levels of community engagement and knowledge sharing were also more likely to incorporate concerns outside of green infrastructure project design into green infrastructure planning and implementation efforts. Projects with the highest levels of community engagement provided more extensive opportunities for residents and stakeholders to engage in green infrastructure planning efforts and offered opportunities for knowledge sharing surrounding a wide range of concerns associated with project impacts and community needs. As described in previous chapters, the planning processes for the Conservation Fund’s Parks with Purpose projects in Atlanta, the Atlanta Beltline, the Proctor Creek North Avenue Watershed Basin Green

Infrastructure Vision plan, and Washington, D.C.'s 11th Street Bridge Park provided these opportunities to the greatest extent of all projects examined in the case neighborhoods, with discussions ranging from issues of race and power, to concerns associated with jobs and housing affordability. Projects in which residents and stakeholders had more opportunities to discuss concerns that extended beyond project design were more likely to incorporate them into plan documents and projects.

In contrast, projects which provided fewer opportunities for public participation generally did not support the incorporation of outside concerns into green infrastructure planning processes. By offering a limited number of public meetings or other opportunities for community engagement, these efforts limited the amount of time in which residents were able to engage in discussions surrounding the impacts of parks and green infrastructure outside of environmental concerns. Lower levels of community engagement also led to the focusing of engagement that did occur on topics surrounding design and amenities. For example, interviewees described planning efforts for Cook Park in Atlanta, led by the Trust for Public Land, as limited to a few public meetings that focused on providing residents with the opportunity to weigh in on park amenities and design, with activities such as placing dot stickers on preferred designs and amenities. Interviewees also noted that the Trust for Public Land planning effort built off of plans for the park included in the Proctor Creek North Avenue Green Infrastructure Vision plan, which was developed with higher levels of community engagement but did not include detailed plans for the park's design. However, while the vision plan discussed workforce development, the Trust for Public Land's planning efforts focused on the park's design and amenities and left out

components of workforce development and jobs that had been included in the original vision plan.

Projects may also delay public engagement until late in planning processes, leading to a focus on correcting design issues. For example, interviewees noted that the Proctor Creek Greenway did not provide opportunities for public input for the Grove Park neighborhood until plans for the project had already been developed. Engagement efforts therefore focused on correcting the initial design, which had failed to provide access to the trail from the neighborhood, over a focus on other concerns, such as displacement of current residents, that have been raised in interviews with residents (Terrell, 2018).

In this way, projects which had high levels of community engagement early in planning processes were more likely to expand planning processes to incorporate concerns outside of project design, while projects which provided fewer opportunities for community engagement or engaged with residents later in planning processes tended to focus the opportunities that did occur on project design and amenities.

9.2.3 Connections to Outside Groups and Funders

Green infrastructure planning processes were also expanded through partnerships with outside groups and funders. These connections sometimes included requirements surrounding the incorporation of specific elements into planning processes, and frequently provided funding, skills, and knowledge that allowed for the expansion of green infrastructure planning efforts to encompass housing affordability and community benefits concerns.

9.2.3.1 Requirements to Expand Planning Processes Associated with Funding

A primary way in which connections to outside groups and funders may shape planning processes is that funding to support projects and their planning processes may come with requirements to expand planning processes to address concerns outside of green infrastructure project design. For example, in the case of the Conservation Fund's Parks with Purpose program in Atlanta, a partnership with the Waterfall Foundation spurred the group to expand their community engagement efforts by making it a requirement of the funding. As one non-profit staff member described,

> "After we did the trip of residents to Milwaukee [focused on providing education and examples of green infrastructure], and came back to Atlanta, we know we had some next steps, but honestly, the Conservation Fund, at that point, our office was a real estate office. We had been in Atlanta since 1988, and basically what we did was purchase land, sell it to a partner. That's our general model. We didn't really have any expertise working with communities here. We knew that it was very complicated over on the Westside. We also knew that our traditional real estate model didn't fit…We had to buy six different properties [for the development of Lindsey Street Park]. The total value of those properties was $95,000, and it took our real estate attorney two years to make that happen because you can't find owners. There are title issues. There are tax liens…Fortunately, a local foundation, the Waterfall Foundation, gave us some funding to not only help paying the time of our real estate attorney, but they really wanted to see community engagement."

In this way, the Conservation Fund's connection to the Waterfall Foundation, a philanthropic group, provided needed funding for park development, but also required the non-profit to expand its focus on community engagement, a goal which required the organization to make important changes to its previous model. The additional requirements surrounding community engagement led the organization to expand its planning processes for Lindsey Street Park by partnering with Resourceful Communities, a program of the Conservation Fund that has worked with rural communities of color in North Carolina for more than 20 years. This new partnership with Resourceful Communities expanded the

Conservation Fund's green infrastructure planning efforts in Atlanta's Westside neighborhoods to encompass a variety of areas of concern. As one non-profit staff member described,

> "We knew that [Resourceful Communities] had a much more robust program for community engagement and involvement. We reached out to them and said, "Hey, can you guys help us here? We know that this is a place where we lack expertise." They said, "Yeah, sure." They said, "Can you get together all of your partners for two days? And we want to host a workshop…" Honestly, we were thinking they were going to send us an agenda that looked like a park visioning exercise. What they sent us was a two-day agenda on race, power, privilege, some very complicated topics…It made us look at these projects in a much different light. It also took me a little while to realize that our staff in North Carolina, in their infinite wisdom, realized that that session was partly for our community partners, and probably more for our internal staff, so that we could better understand the skillsets that we needed to really work in these communities. So that was a really awesome thing that they helped us to be able to navigate through that and build these much more significant relationships in these communities."

In this way, social capital in the form of connections to outside organizations to meet funding and skills needs led to the expansion of a green infrastructure planning processes to encompass additional community engagement efforts, which focused on a variety of topics outside of green infrastructure project design.

9.2.3.2 Skills, Knowledge, and Resources

In addition to requirements for incorporating specific elements into green infrastructure projects, connections to outside groups and funders also provided skills, knowledge, and resources that often supported the expansion of green infrastructure projects and planning processes.

First, connections to outside groups constituted an important source of skills and knowledge for green infrastructure planning processes that supported the expansion of

planning processes. Following extensive community engagement efforts, projects that expanded their planning processes to incorporate issues outside of project design tended to be those that made strong connections to outside groups to further engage housing affordability and community benefits concerns. Connecting with outside groups in areas of concern to residents allowed green infrastructure organizations to expand the scope of projects without having to "reinvent the wheel," as one non-profit staff member described. For example, Building Bridges Across the River connected with Skyland Workforce Center in Washington, D.C. to support its workforce development program surrounding the 11th Street Bridge Park, including training in construction, as well as mentorship targeting soft skills. Building Bridges Across the River has also partnered with housing organizations such as Manna to expand work the organization was already doing around homebuyers' clubs. The organization also connected with City First Homes, a non-profit focused on social finance and expanding wealth in low-income communities, to start a community land trust. These connections provided skills in areas outside of green infrastructure project design, including areas such as workforce development, homeownership, and community land trusts, which allowed Building Bridges Across the River to expand the 11th Street Bridge Park project and planning process to encompass additional areas of concern to residents.

The existence of organizations and agencies working in areas such as housing affordability and workforce development shaped the extent to which projects were able to form these connections. In this way, the cities' institutional context of non-profit, grassroots, and government actors available to partner with on these areas of concern

shaped further engagement of equitable development concerns. Chapter 11 discusses the role of institutional context in greater depth.

Finally, connections to outside groups provided sources of funding that supported the expansion of green infrastructure planning processes. Projects that were able to connect to corporate or philanthropic sponsors interested in expanding green infrastructure projects to encompass additional areas of concern were more easily able to implement initiatives falling outside of green infrastructure project design and implementation. For example, the Conservation Fund partnered with the UHaul corporation, among other funders, to support its partnership with the Greening Youth Foundation focused on workforce development. Similarly, the 11th Street Bridge Park attracted funding from philanthropic sources, including a $10 million investment from Chase to support Building Bridges Across the River and its partners in work around housing affordability, workforce development, and small business development, and a $50 million commitment from the Local Initiatives Support Corporation to be invested in the neighborhoods surrounding the park. In this way, the ability of green infrastructure project leader, and non-profit organizations to attract funding for work surrounding green infrastructure and issues of equitable development.

9.2.4 Project Leadership

Project leadership is another important factor in shaping whether and how housing affordability and community benefits concerns were incorporated in projects. Both the commitment of project leadership to meeting goals discussed in planning processes and the flexibility of organizations in pivoting planning and implementation processes to address

these concerns shaped the extent to which these concerns were incorporated in green infrastructure projects.

9.2.4.1 Commitment of Project Leadership to Meeting Goals Discussed in Planning Processes

The commitment of project leadership to ensuring projects met goals discussed in by residents in planning processes was an important factor that shaped whether projects expanded their planning processes to incorporate concerns outside of project design. Leadership in most green infrastructure planning processes examined as part of this case study focused primarily on project design and did not view issues of housing affordability and community benefits as falling within the scope of projects. Project leadership with this perspective typically did not adjust planning processes to address these concerns when they were brought up or make efforts to incorporate these concerns into projects.

While most organizations or agencies leading green infrastructure projects focused almost exclusively on project design, some leaders actively sought out partnerships and funding to achieve housing affordability and workforce development goals discussed in planning processes. Interviewees described the importance of the commitment of project leadership to addressing residents' and other stakeholders' goals discussed in planning processes as an important factor in shaping how projects and their planning processes pivoted to address concerns outside of green infrastructure project design. In some cases, project leadership played active roles in expanding planning processes and in developing partnerships with outside groups and stakeholders to address concerns surrounding housing affordability and community benefits that were discussed in planning processes.

Leadership in multiple planning processes expanded planning processes and sought out connections with outside groups in order to address housing affordability or workforce development goals discussed in these processes. For example, after hearing from residents in design-focused planning processes about concerns surrounding the park's impacts and the need for jobs, workforce development, and housing affordability, leadership for the 11th Street Bridge Park met with the Local Initiatives Support Corporation (LISC DC) to see how the organizations might partner to "think about how the Bridge Park could be a good neighbor" and "try to get ahead of the impact that a signature park would have on surrounding land values." This meeting and additional efforts by the project's leadership to ensure that goals discussed during planning processes were prioritized led to the formation of the park's Equitable Development Task Force and its planning process focused on addressing equitable development concerns. In another example, after hearing residents' concerns surrounding jobs and workforce development during planning processes, the Conservation Fund in Atlanta actively sought out a partnership with the Greening Youth Foundation in order to include a workforce development component in the development of Lindsay Street Park.

9.2.4.2 Flexibility of Nonprofit Organizations

In addition to commitment of project leadership to meeting goals discussed in planning processes, the level of flexibility of organizations and agencies leading green infrastructure projects shaped the ability of social capital to support the expansion of green infrastructure planning processes. Nonprofit groups were typically the most flexible with regard to expanding planning processes and partnerships to address these concerns in some way, while government agencies were less flexible in this regard.

Nonprofit groups leading green infrastructure planning processes were most likely to be flexible with regard to expanding planning processes and projects to encompass areas of concern outside of green infrastructure project design. Of all organizations and agencies leading green infrastructure planning processes examined as part of this study, the nonprofit organization Building Bridges Across the River in Washington, D.C. exhibited the greatest level of flexibility in this regard; however, other nonprofit organizations exhibited a level of flexibility with regard to the incorporation of housing affordability and community benefits components into projects and their planning processes as well. The initial planning process for the 11th Street Bridge Park focused on the project's design and which amenities would be included, but the nonprofit leadership heard repeated concerns from residents surrounding housing affordability, jobs, workforce development, and small business development. In response, Building Bridges Across the River made substantial adjustments to the park's planning process, bringing together an 'Equitable Development Task Force' comprised of staff from community organizations, nonprofit groups, and government agencies to develop a new equitable development planning process. The task force engaged more than 50 government agencies, nonprofit organizations, and community groups in the development of an Equitable Development Plan for the park. In this way, the flexibility of the nonprofit organization supported the expansion of the park's planning to include a new process focused on equitable development concerns.

At a smaller scale, in Atlanta, the nonprofit groups The Conservation Fund and Park Pride led a 2-year planning process for Lindsey Street Park in the English Avenue neighborhood, in which residents expressed concerns surrounding jobs and workforce development. In response, the nonprofit groups developed partnerships with the nonprofit

Greening Youth Foundation and UHaul corporation to create jobs for several neighborhood youth in the park's construction. The Conservation Fund also greatly expanded upon its previous role in the Atlanta neighborhoods to encompass a larger community engagement component in its role leading green infrastructure planning in the city's Westside neighborhoods.

The flexibility of nonprofit organizations has been supported by their ability to obtain funding from corporate groups and other funders. The 11th Street Bridge Park and the equitable development planning efforts surrounding it, in particular, have received philanthropic resources from a variety of sources. In 2017, JPMorgan Chase agreed to donate $10 million in Wards 7 and 8, including $5 million to support the park's efforts at preserving affordable housing in its impact area (O'Connell, 2017). Building Bridges Across the River has also partnered with the Local Initiatives Support Corporation (LISC) in its Elevating Equity Initiative, devoted $50 million to fostering equitable and inclusive development in the surrounding neighborhoods (LISC, n.d.). In Atlanta, the Conservation Fund connected with corporate and philanthropic sponsors to support the workforce development of its parks and green infrastructure projects.

While nonprofit groups were usually the most flexible in their planning process and areas of focus, government agencies typically only pivoted in this way when a mandate and funding was in place requiring the agency to cross boundaries in this way. Washington D.C.'s sewer and water authority, D.C. Water, provides an example of a government agency that has expanded its focus in a large way by developing a nationwide green infrastructure certification program and requiring the hiring of district residents for the contracts for the construction of green infrastructure projects. When D.C. Water, the

District government, and federal agencies agreed to modify a 2000 consent decree to allow for the use of green infrastructure to address water quality goals, the agency was required by an agreement with the District government to implement requirements for hiring and develop a green infrastructure certification program. In contrast, Atlanta's consent decree has not included specific requirements surrounding workforce development or housing affordability, and the city's Department of Watershed Management has not engaged in similar efforts, with the exception of a mention of workforce development in its Green Infrastructure Strategic Action Plan.

9.3 Organizational Change

The development of social capital in green infrastructure planning processes also led to organizational change, including expansion of program areas, the addition of or changes in staff members, and the formation of new organizations focused on green infrastructure implementation.

9.3.1 *Expansion of Organizations' and Agencies' Areas of Focus*

Within the case cities, the development of social capital surrounding green infrastructure has led to the expansion of organizations' and agencies' areas of focus. In particular, social capital has supported an increased focus on green infrastructure planning in general, as well as on the incorporation of housing affordability and community benefits concerns into projects and their planning processes.

Social capital in support of green infrastructure has supported an increased focus on green infrastructure planning and implementation. In several cases, activism by community

organizations and government agencies and resulting legal requirements surrounding water quality and the implementation of green infrastructure have supported increased engagement and partnerships at the government level. In Atlanta and Washington, D.C., legal action by citizen groups and government agencies led to consent decrees requiring action to improve water quality in Proctor Creek and the Anacostia River, and requirements for cleaning up these water bodies supported increased engagement in green infrastructure planning as a way to reduce combined sewer overflows. In Atlanta, the Department of Watershed Management was formed in part to address the 1998 and 1999 consent decree requirements for water quality improvements and has utilized both green and gray infrastructure in fulfilling them. Washington, D.C.'s 2005 consent decree and its 2016 modification surrounding the use of green infrastructure have catalyzed increased planning for green infrastructure by D.C. Water, the city's water and sewer authority. In this way, activism and legal requirements surrounding water quality have supported an increased focus on green infrastructure planning at the government level.

In addition to the consent decree requirements, community groups have supported further expansion of government agencies' focus on green infrastructure through collaboration and partnerships. In Atlanta, a 2012 peer exchange trip to Philadelphia for agency staff members organized by the Conservation Fund supported the formation of the city's Green Infrastructure Task Force, a partnership among government agencies and community partners convened by the city's Department of Watershed Management. The formation of the task force led to increased focus on green infrastructure planning at the government level through collaboration among agencies and, ultimately, the development of the city's Green Infrastructure Strategic Action Plan in 2016.

Organizations and agencies have also expanded their programmatic areas to encompass additional concerns as a result of social capital development surrounding housing affordability and community benefits concerns. For example, as described in previous sections, in response to concerns surrounding impacts of the 11th Street Bridge Park brought up during design-focused planning processes, Building Bridges Across the River formed its Equitable Development Task Force to lead its equitable development planning process. In response to support for the development of a community land trust to support housing affordability goals, the organization formed a Community Land Trust Advisory Board to implement the land trust. In another example, the Conservation Fund in Atlanta expanded its Parks with Purpose program to include a workforce development and jobs component after hearing from residents in planning processes that these were primary areas of concern. The organization also expanded its work in Atlanta to encompass community engagement surrounding issues of race and power after connecting with the Waterfall Foundation and Resourceful Communities.

Further, in response to negotiations with the District administration surrounding the importance of jobs and workforce development, D.C. Water entered into a Green Jobs M.O.A. with the government of the District of Columbia regarding job opportunities and certification of green infrastructure workers. Following this agreement, D.C. Water developed the National Green Infrastructure Certification Program in partnership with the Water Environment Federation.

9.3.2 Changes in Staff

Planning processes expanded to encompass a variety of concerns outside of green infrastructure, and some organizations and agencies implemented changes in staff reflect these concerns. Building Bridges Across the River in Washington, D.C. added a staff member in the role of Equitable Development Manager to implement its Equitable Development Plan. Similarly, in response to activism regarding housing affordability surrounding the Atlanta Beltline, the project's CEO stepped down from his position (Stafford and Mariano, 2017), and Atlanta Beltline, Inc. later hired an Equity and Inclusion Officer (Sams, 2018). Changes in staff may be made in response to input from community engagement in green infrastructure planning processes, as was the case with Building Bridges Across the River and the 11th Street Bridge Park, and advocacy or negative attention surrounding project impacts, as was the case with the Atlanta Beltline.

9.3.3 Formation of New Organizations

Finally, social capital surrounding green infrastructure may support the development of new organizations and coalitions. In the case study neighborhoods, the building of networks of communication surrounding specific green infrastructure planning efforts and around the opportunities and threats associated with green infrastructure in general supported the development of these new organizations. As described in Chapter 8, groups such as the Proctor Creek Stewardship Council, the Atlanta Watershed Learning Network, and the Anacostia Park and Community Collaborative formed to focus on the opportunities and threats posed by green infrastructure. In particular, the Atlanta Watershed Learning Network formed after the non-profit ECO-Action conducted educational sessions with residents of the Entrenchment Creek Watershed on addressing flooding concerns, and

residents recommended expanding the training to participants living in the Proctor Creek watershed. As one non-profit leader described,

> "We started in the Entrenchment Creek, actually, focusing on the flooding in the Turner Field stadium communities of Peoplestown, Summer Hill and Mechanicsville. So we started with about ten resident participants about three years ago. That was the first group. Then people came to us and said, "We need to get the Proctor Creek involved." That's how the Atlanta Watershed Learning Network evolved."

In this way, the development of networks and connections focused on the impacts of green infrastructure led to the formation of new coalitions and organizations. These new organizations, focused on green infrastructure and its impacts, have supported community residents in taking active roles in green infrastructure planning processes through education, training, and information sharing.

9.4 Limitations of Social Capital in Shaping Green Infrastructure Projects and Planning Processes

While some green infrastructure projects and their planning processes have expanded to include housing affordability and community benefits concerns, several limitations exist with regard to the incorporation of these concerns. Limitations exist with regard to a typically narrow focus of environmental organizations and agencies on parks and stormwater management concerns; the incorporation of equity concerns into projects and plans in limited ways; the slow speed of implementation of housing and workforce development components in the face of quickly-changing market dynamics; and a lack of prioritization and implementation of housing affordability and workforce development goals that are included in plan documents.

9.4.1 Narrow Focus of Environmental Organizations and Agencies

A primary limitation for the incorporation of housing affordability and community benefits concerns into green infrastructure projects is the generally narrow focus of the environmental organizations and government agencies that typically lead green infrastructure projects on park development and stormwater management concerns. Staff members at environmentally-focused government agencies and park nonprofits described their lack of sufficient knowledge and capacity to address concerns outside of green infrastructure planning, such as the housing implications of projects, and emphasized the need to for other organizations and city government to address these outside concerns. As one park nonprofit employee described,

> "I think all investments in communities are going to impact property values, unless there's different controls that are put in place, or policies that address those types of issues. So, we're supportive of those types of things, and would like to play a role. But also, at the end of the day, I feel like my lane is more of building parks and making it so we're doing it in a way that's engaging the community and that kind of thing. And there's only so much that we can do to fix the affordable housing issue, we really need both the city to kinda step up, but also to support different groups where that's their lane, to support them…There's only so much that my organization can do to be a part of the solution on the affordable housing side of things, as well as the jobs creation side of things. So again, I think we want to be informed; we want to be part of the conversation; we want to work in collaboration with others that are advancing those kind of conversations. But at the end of the day, we need someone else to carry the ball on this."

Environmental government agencies partnering on green infrastructure projects have generally echoed these concerns. As one environmental agency employee in Atlanta stated regarding the ability of the agency to address housing affordability concerns,

> "The thing is we also hear concerns expressed about flooding and 'you guys need to come and fix this.' And so, we are attempting to come in and fix things that are broken or try to address some of the flooding issues, and you know, we're not necessarily able to be responsible for the real estate market implications of that."

Park nonprofit staff also emphasized the challenges associated with supporting sustainable changes regarding equity concerns such as jobs and workforce development through the creation of individual parks and green infrastructure projects.

In this way, environmentally-focused agencies' and nonprofits' views of the impacts of green infrastructure regarding housing affordability and the potential for addressing community benefits concerns such as job creation and workforce development as outside their expertise or capacity constituted a barrier to the incorporation of these components into green infrastructure projects and their planning processes. While organizations and agencies were generally open to collaborating with other groups surrounding these concerns, their view of the issues as falling outside the scope of their own work may create barriers to addressing the impacts of projects, particularly in cities such as Atlanta in which policy addressing housing affordability is limited.

9.4.2 Incorporation of Equity Concerns in Limited Ways

Several projects were able to incorporate small components related to housing workforce development, but most staff members also emphasized that these areas were not their primary focus. For this reason, when concerns outside of green infrastructure were incorporated into plans and projects, they were sometimes incorporated into projects at a limited scale or included in plan documents in vague or limited ways. However, some groups viewed the incorporation of small-scale components in projects as ways to leverage larger-scale efforts at the city level.

The workforce development component in the Conservation Fund's Parks with Purpose program in Atlanta provides an example of a case in which workforce

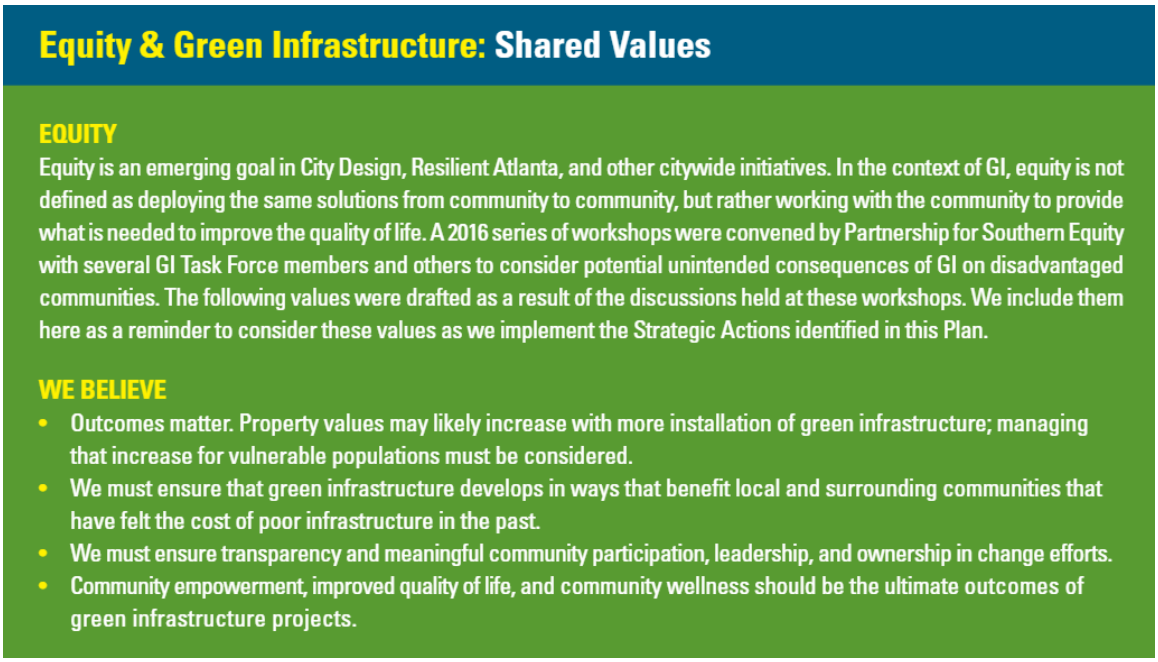
development was included in a project in a limited way. After hearing from residents during park planning processes that workforce development and job creation were primary concerns, the organization partnered with the Greening Youth Foundation, a workforce development non-profit group, in order to hire young adults for park construction. While the construction of Lindsey Street Park, for example, created jobs and training for four young adults during the park's construction, the jobs component of the park was small-scale and temporary. However, non-profit staff also expressed hope that the workforce development component might be leveraged to support broader implementation at the city level. As one non-profit leader described,

> "It's really a small piece of the puzzle, and it's small because you only need so many people to build out a park. That's a temporary job, but by providing that training, the idea is for people to be ready to take on other jobs, and what we're able to do with those little small things is to leverage that with the city and others to figure out how we can turn this into a bigger initiative so that we're not just talking about these one-off park projects where people can get employed, but how can that initial investment be leveraged so that people end up maybe getting a job with the parks department or with some of the for-profit developers and others, to try to craft something and to look at all sorts of pathways or ways that people can get into these jobs, into green infrastructure related jobs as green infrastructure projects are on the rise in the city and, not only the installation of them, but how they're maintained. People will be needed to do that as well."

In this way, although equity concerns were sometimes incorporated into projects in small ways, the development of small programs through individual green infrastructure projects was considered as a potential starting point for development of larger-scale programs.

Similarly, equity concerns are often included in plan documents in vague or limited ways. For example, the City of Atlanta Green Infrastructure Action Plan, published in 2017, mentions the potential for property value increases associated with projects and notes that "managing that increase for vulnerable populations must be considered" (see Figure

30). Yet, the plan's recommended actions for policy, funding, planning, and implementation include only one strategy for address displacement concerns--to "Work with [Tax Allocation Districts] to address stormwater issues using GI during the redevelopment process and address potential gentrification/ unintended consequences of quality of life improvements." Notably, Tax Allocation Districts rely on property value increases for their funding, so there are significant tensions inherent in this recommendation. The plan doesn't provide other recommendations for limiting gentrification and displacement. Importantly, the plan does include a recommendation for working with partners to develop a green infrastructure workforce training program, although it doesn't specify how this might be done. All other recommendations focus on facilitating the implementation of green infrastructure.



Equity & Green Infrastructure: Shared Values

EQUITY

Equity is an emerging goal in City Design, Resilient Atlanta, and other citywide initiatives. In the context of GI, equity is not defined as deploying the same solutions from community to community, but rather working with the community to provide what is needed to improve the quality of life. A 2016 series of workshops were convened by Partnership for Southern Equity with several GI Task Force members and others to consider potential unintended consequences of GI on disadvantaged communities. The following values were drafted as a result of the discussions held at these workshops. We include them here as a reminder to consider these values as we implement the Strategic Actions identified in this Plan.

WE BELIEVE

- Outcomes matter. Property values may likely increase with more installation of green infrastructure; managing that increase for vulnerable populations must be considered.
- We must ensure that green infrastructure develops in ways that benefit local and surrounding communities that have felt the cost of poor infrastructure in the past.
- We must ensure transparency and meaningful community participation, leadership, and ownership in change efforts.
- Community empowerment, improved quality of life, and community wellness should be the ultimate outcomes of green infrastructure projects.

Figure 30: Equity in City of Atlanta Green Infrastructure Action Plan (City of Atlanta Department of Watershed Management, 2017)

9.4.3 Speed of Implementation in the Face of Quickly Changing Markets

Groups such as Building Bridges Across the River who actively sought out partnerships with a variety of organizations and agencies and secured large amounts of funding for equitable development planning and implementation of projects identified through planning processes were most successful in addressing a variety of equity concerns in ways that have the potential to be sustainable in the long term. Yet, concerns remain regarding whether market forces in the Ward 8 neighborhoods are moving faster than the nonprofit is able to put its identified strategies in place. Inflation of housing prices and rents in these neighborhoods have been among the highest in the District over the past several years, and many of the nonprofit's strategies, such as its community land trust, are just beginning to be implemented, creating concerns surrounding the speed of implementation of strategies that are identified to address equitable development concerns.

9.4.4 Lack of Implementation of Goals Included in Plan Documents

Finally, equity-related goals included in plan documents may not be prioritized in implementation. This concern coincides with the incorporation of social equity goals and concerns into plan documents in vague ways, which creates challenges regarding measuring implementation of these goals, although lack of implementation has also been a concern surrounding projects with specific goals for housing affordability and community benefits in their plan documents. This has been the case with the Atlanta Beltline project, which initially created goals for the development of 5,600 affordable units in its Tax Allocation District but has received criticism for failing to prioritize and implement this goal.

Although environmental nonprofits and government agencies often emphasized these limitations in their abilities to address concerns outside of parks and green infrastructure, some nonprofit organizations served as advocates for city agencies to address these concerns at a larger scale or provided training to neighborhood residents to serve as advocates around equity concerns. These efforts are discussed further in the following section.

9.5 Mediating Factors

9.5.1 Structure and Funding of Green Infrastructure Organizations

The structure and funding mechanisms for green infrastructure organizations are mediating factors that shaped the incorporation of outside concerns into green infrastructure projects.

The Atlanta Beltline provides an example of a project with a structure and funding mechanisms that relied on increases in property values surrounding the project and did not prioritize goals outside of implementation of the trail itself through fundraising efforts. The Tax Allocation District funding mechanism for the Atlanta Beltline was predicated on the fact that property values surrounding the project would increase, which would support further funding of the project's trail, parks, and transit. In this way, property value increases and associated increases in rents and housing costs were vital to the project's implementation. While the project's leadership at Atlanta Beltline, Inc. created a citizen advisory committee its Affordable Housing Trust Fund, known as the Beltline Affordable Housing Advisory Board, ABI did not adjust its priorities based on warnings from the committee regarding rising housing costs, gentrification, and displacement (Beltline

Affordable Housing Advisory Board, 2008). Further, the project's fundraising arm, the Atlanta Beltline Partnership, focused on fundraising for the design and construction of the trail itself, basing its actions on a survey of donors which showed that these groups preferred to contribute to amenities such as trails and parks over other goals such as affordable housing development.

In contrast, Building Bridges Across the River, the non-profit in charge of planning for the 11th Street Bridge Park, is raising the majority of funds for construction of the $50 to $55 million park project, with the District contributing approximately 30 percent of funding. The organization has focused on recruiting corporate and non-profit donors to support implementation of the project's equitable development plan, including $10 million from JP Morgan Chase to be invested in Wards 7 and 8, $5 million of which is slated for affordable housing preservation, as well as $50 million from the non-profit Local Initiatives Support Corporation through its Elevating Equity initiative, which focuses on supporting equitable development in the neighborhoods within a 1-mile radius of the park (O'Connell, 2017). The non-profit also hired an Equitable Development Manager to support the implementation of its Equitable Development Plan, including developing partnerships with organizations focusing on housing affordability, workforce development, and small business development, and supporting the development of the Douglass Community Land Trust, the idea for which emerged from the park's equitable development planning process. The land trust's advisory committee, for which two thirds of members were neighborhood residents, controlled decision-making for a key housing affordability component of the park's equitable development planning efforts.

In this way, the structure and funding of projects provide a foundation from which goals included in planning documents were implemented. The structure and funding mechanisms for the 11th Street Bridge Park project, including funding and staff devoted to implementation of the project's Equitable Development Plan and community leadership of key housing affordability initiatives, have supported the implementation of goals included plan documents. In contrast, the funding mechanism for the Atlanta Beltline relied on increasing housing values and costs in order for the project's implementation to occur. Further, while the Beltline's organization structure included mechanisms for community leadership, such as the Beltline Affordable Housing Advisory Board, the recommendations made by this community-led board were not heeded by project leadership, and implementation of project's affordable housing goals were not made a priority.

9.6 Discussion

This chapter examined how social capital developed within and outside of green infrastructure planning processes can shape green infrastructure projects and planning processes. The evidence presented in this chapter addresses Hypothesis 3: *Increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these projects and their planning processes.* The chapter presented evidence to provide clarity around this hypothesis.

First, social capital can shape green infrastructure projects directly if projects incorporate concerns discussed by residents in planning processes. In this way, social capital can physically shape projects through the incorporation of design elements or

amenities that reflect the interests and needs of residents, including incorporating elements focused on achieving goals related to social equity concerns. Almost all projects examined in the study were physically shaped by the incorporation of residents' concerns for project design, whether this occurred early or later in planning and implementation processes. As green infrastructure planning processes typically began with a focus on project design and amenities, the physical aspects of projects were a primary way in which residents and community organizations could shape how investments in green infrastructure would impact their communities. The inclusion of specific design elements or amenities in projects supported community benefits including providing community gathering, cultural, and educational spaces; building connections to green infrastructure projects such as trails in low-income communities; using specific green infrastructure techniques to support residents' design goals for their communities; and including design elements to address social and economic issues (e,g., the inclusion of a splash pad in Cook Park to provide residents without access to air conditioning with the ability to cool off in the summer).

In contrast, the expansion of green infrastructure planning processes to address issues outside of project design, such as housing affordability and workforce development, was less common, only occurring in a few projects in the case neighborhoods. Specifically, the 11th Street Bridge Park in Washington, D.C., the Atlanta Beltline, and the Conservation Fund's Parks with Purpose parks in Atlanta expanded their planning processes to incorporate elements outside of park design. The study found that these additional elements were more likely to be incorporated into projects with high levels of knowledge sharing, community engagement, and community leadership in planning processes, larger networks with greater numbers of connections to outside groups, and the commitment and flexibility

of project leadership to ensuring projects met neighborhood goals. In this way, the ability of social capital to expand green infrastructure planning processes to incorporate additional areas of concern was limited by the organization or agencies' ability and willingness to engage areas outside of project design.

In addition to shaping green infrastructure projects and their planning processes, social capital also drove change at an organizational level. Organizational change occurred when organizations and agencies leading green infrastructure projects expanded their areas of focus at an organizational level to encompass housing affordability and/or community benefits concerns, and when organizations implemented changes in staff to address housing affordability and community benefits concerns surrounding projects. Social capital developed around green infrastructure also supported the creation of new organizations focused on the opportunities and threats posed by green infrastructure in low-income communities. These organizational changes have the potential to shape current and future green infrastructure projects regarding the incorporation of housing affordability, community benefits, and other social equity concerns surrounding green infrastructure projects.

While planning processes sometimes led to the inclusion of housing affordability and community benefits concerns in projects and planning processes, or to organizational changes, multiple barriers existed for social capital to support the incorporation of these concerns. First, most green infrastructure projects in the case neighborhoods were led by environmental organizations or park nonprofits with a narrow focus on parks or stormwater management, which did not consider housing affordability or workforce development as significant components of their missions. In rare occasions when these outside components

were included in projects or plans, they have often been incorporated into projects in limited ways or with a slower timeframe than would allow them to adequately respond to quickly-changing market dynamics. Further, when housing or workforce development goals have been incorporated into plan documents, they have often not been prioritized in implementation regarding devotion of staff and resources. Although projects frequently exhibited these limitations regarding incorporating housing or workforce development concerns, interviewees described the potential for smaller projects that incorporated these components to serve as models for citywide projects or programs, and nonprofit groups and coalitions have pushed city agencies to expand and extend smaller project-level efforts to become citywide programs or requirements.

Finally, the structure and funding of green infrastructure organizations also constitutes an important mediating factor regarding the potential for social capital to shape green infrastructure projects and planning processes with regard to the incorporation of housing and affordability and community benefits concerns.

Overall, the evidence presented in this chapter complicates the hypothesis that increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these projects and their planning processes. Project planning processes that included the most extensive community engagement, connections to outside groups, and flexible project leadership committed to meeting community needs were most likely to expand their planning processes in this way. Yet, even in these cases, significant limitations exist regarding the ability of social capital to support the incorporation and implementation of housing affordability and community benefits elements.

CHAPTER 10. THE ROLE OF SOCIAL CAPITAL IN SHAPING POLICY DEVELOPMENT AND ADVOCACY TIED TO GREEN INFRASTRUCTURE

As described in the conceptual framework and elaborated on in Chapter 8, research has proposed that green infrastructure projects and planning efforts can support the development of social capital. The previous chapter described how this social capital developed surrounding green infrastructure planning and implementation might shape green infrastructure projects themselves regarding project design, amenities, and focus on concerns such as housing affordability and community benefits. In addition to shaping projects themselves, social capital may also support the institutionalization of housing affordability and community benefits policies and strategies that aim to address the impacts of green infrastructure projects on land and housing markets (see Figure 31).

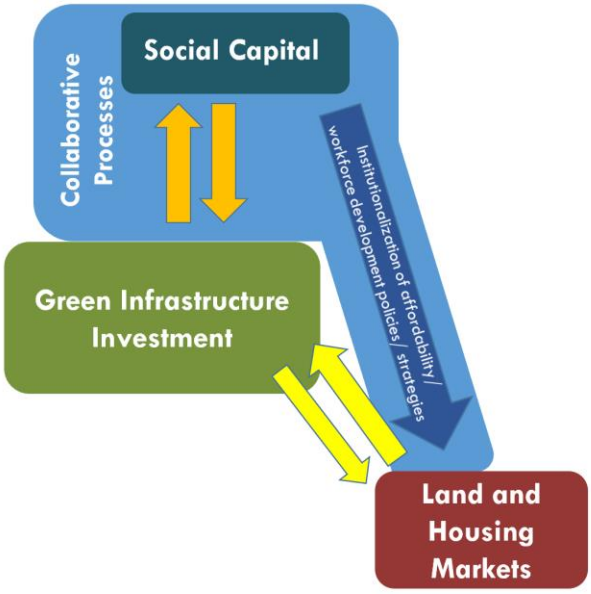


Figure 31: The role of social capital in shaping policy development and advocacy

Green infrastructure projects have been the focus of advocacy for policy change surrounding housing affordability and workforce development and the development and testing of new policies and programs surrounding housing affordability and workforce development.

Along with chapter 9, this chapter addresses the research question *How does social capital shape green infrastructure planning and equitable development?* As described in the chapter on research questions, hypotheses, and research design, shaping green infrastructure planning and equitable development could include shaping projects themselves and their planning processes, as well as institutionalization of policies and strategies addressing housing affordability, gentrification and displacement, and community benefits. Chapter 9 discussed how social capital has shaped projects and their planning processes, and this chapter examines how social capital has shaped the institutionalization of policies and strategies. In particular, this chapter responds to

Hypothesis 4: *Increases in social capital among actors internal to neighborhoods surrounding issues of housing affordability, gentrification, and community benefits concerns will lead actors external to neighborhoods to develop and implement policies and strategies to address these concerns.*

In evaluating this hypothesis, section 10.1 examines the extent to which internal and external groups put pressure on city leadership to address housing affordability and community benefits concerns in policies and strategies through advocacy and coalition-building. Section 10.2 examines the extent to which, as pressure to address these concerns increases, government leaders take actions and develop policies, programs, and strategies to address them in some way.

10.1 Green Infrastructure as a Driver of Coalition Building and Advocacy

10.1.1 Support for Green Infrastructure Implementation

First, coalition building and advocacy have occurred with regard to advancing green infrastructure implementation. Groups have formed with the goal of addressing environmental justice threats and supporting access to environmental benefits by advancing green infrastructure implementation. As was discussed in Chapter 8, groups such as the West Atlanta Watershed Alliance, the Proctor Creek Stewardship Council, and the Atlanta Watershed Learning Network in Atlanta, and the Anacostia Park and Community Collaborative in Washington, D.C. have supported green infrastructure implementation to address environmental threats, such as flooding, and provide access to environmental benefits, such as social and recreation opportunities.

Coalitions have also formed around advancing specific projects. Early on in planning processes, a broad coalition formed in support of funding and implementing the Atlanta Beltline, to an extent that mayoral candidates faced significant pressure to support the project's implementation. As one urban planner involved with the project described,

> "In 2009 when Mayor Reed was first elected…in that election you couldn't be a viable candidate without supporting the project and having some plan for how you were going to do it better and faster. The political power of the people believing in it is the thing that keeps in on track, the thing that keeps it moving."

Similarly, neighborhood social capital drove the planning process for the development of Proctor Creek North Avenue Watershed Basin: A Green Infrastructure Vision, led by park pride, as residents approached the organization with the goal of using parks and green infrastructure to address flooding problems in neighborhoods within the Proctor Creek watershed. In this way, green infrastructure has been supportive of advocacy around green infrastructure generally as well advocacy for the implementation of specific projects.

10.1.2 Support for Policy Change Surrounding Housing Affordability and Community Benefits

In addition to supporting advocacy and coalition building around project implementation, green infrastructure projects have also served as a focus point for advocacy for policy change surrounding housing affordability and workforce development, and coalitions have developed advocacy efforts around the impacts of specific projects as well as the need for policy change more generally. These efforts have developed both outside of or in response to green infrastructure planning efforts as well as within planning efforts. In cases in which residents and advocates did not consider projects' community

engagement or efforts to address concerns discussed in processes to be sufficient, they often responded with advocacy, protests, or lawsuits.

Outside of project planning efforts, large projects that created concerns surrounding gentrification and displacement—both anecdotally and as described in academic and planning studies—have created a focus point for advocacy groups in which these groups' concerns can be focused and legitimized. These large green infrastructure projects in particular, such as the Atlanta Beltline and 11th Street Bridge Park, have provided a focus point for groups to advocate for policy change to address equity concerns such as increases in housing costs and the need for jobs and workforce development opportunities.

For example, the Housing Justice League in Atlanta was formed in response to a variety of new development coming to south Atlanta but has more recently focused its campaign efforts around the impacts of the Atlanta Beltline project in particular. The group chose to focus its housing affordability campaign on the Beltline because of the loop's impacts around much of the entire city and because of the investment of public money and land into the project. The group's 2017 report on the project's impacts, entitled *BeltLining: Gentrification, Broken Promises, and Hope on Atlanta's Southside*, explores the projects impacts using census data, survey results, academic research, and residents' stories. In this way, the Beltline has served as an opportunity for the group to share knowledge, empower community residents, build a campaign and coalition, and advocate for policy change around the specific threat of a project, rather than the general idea of gentrification. The advocacy effort has focused on putting forth a policy platform and putting pressure on Beltline leadership to improve its affordable housing development record. The group has been successful in drawing attention to issues of housing affordability surrounding the

Atlanta Beltline through actions including protests, canvassing, and attending Atlanta Beltline meetings. As one nonprofit leader described,

> "Our goal is not to mainly focus on the development, our goal…is to build power within residents, so that they're strengthened through organizing. So that policies are reflective of those living in these communities. So, any type of development that's coming towards this area, of that are negatively impacting residents, we have an obligation to make sure that people are empowered to basically stand up for their community."

In this way, groups at the neighborhood level have focused on the impacts of large green infrastructure projects in order to empower residents to advocate for the development of policies to address housing affordability and community benefits concerns.

Within project planning efforts, on rare occasions coalitions have advocated for policy change by participating in citywide planning processes surrounding housing affordability and workforce development concerns. A coalition developed through the 11th Street Bridge Park's equitable development planning process has advocated for amendments to the city's comprehensive plan. As one nonprofit leader described,

> "We're starting to see where there's areas where we can have collective action. The city's going through its five-year…comprehensive plan…that will drive HUD dollars for the next five years. Like is there an opportunity for all of us to sign off on amendments to make sure that we're thinking about these larger issues of equity that are deeply embedded in the plan. There's talk about those but not a lot of teeth in the plan, so we have lent our name, for instance, and lots of our partners sitting around the table sort of lent their name to make a bigger impact. We don't know if all of those amendments are gonna be incorporated, but many of them have, so how do we speak for the larger collective impact for bigger results?"

Similarly, the Douglass Community Land Trust, which formed out of the 11th Street Bridge Park's planning efforts, has advocated for additional funding for the city's Housing Production Trust Fund, a fund for affordable housing development that was developed in 2014 and has received approximately $100 million annually since 2016. The land trust

leadership has advocated to the city council regarding direct line item funding for the land trust or increasing funding for the Housing Production Trust Fund.

In addition to advocacy for policy change and funding, groups have also used legal methods in attempts to meet goals for housing affordability and limiting displacement. In Washington, D.C., residents responded to development surrounding the Poplar Point waterfront park, which they viewed as not addressing gentrification concerns, with a lawsuit focusing on the project's failure to meet the city's comprehensive plan goals around limiting gentrification.

10.2 Green Infrastructure as a Driver of the Development of Policies and Strategies to Address Housing Affordability and Community Benefits Concerns

Advocacy at the neighborhood level for policy change surrounding housing affordability and community benefits concerns associated with green infrastructure projects has led city leaders to develop policies and strategies aiming to address these concerns in several cases. These policies and strategies have often focused specifically on areas impacted by the development of large green infrastructure projects. In some cases, advocacy groups had supported the implementation of policies for long periods of time, and the impacts of large green infrastructure projects created a highly visible need for their implementation. While some of these concerns were addressed externally to neighborhoods through government policy, they were also addressed at the project or neighborhood level by internal neighborhood actors.

Multiple policies and strategies have been developed in the case cities in recent years which focus on the impact areas of green infrastructure projects. These include an

inclusionary zoning ordinance in Atlanta focused on Beltline and Westside neighborhoods; an Antidisplacement Tax Fund for the Westside neighborhoods, which city leaders associated with the Beltline; and a green infrastructure certification program and hiring requirements that came out of a MOA between DC Water and the District of Columbia.

In 2017, the Atlanta City Council signed into law an inclusionary zoning ordinance focused on the Atlanta Beltline and the city's westside neighborhoods. While housing advocates in the city have supported the implementation of a citywide policy for many years, increasing housing costs and pressure surrounding housing affordability around the Atlanta Beltline and the Mercedes Benz stadium catalyzed its eventual implementation in 2017. As one city official described,

> "Well, so the affordable housing advocates, the real ones that have been around for years, they have been talking about housing affordability in Atlanta long before ... They've been doing this for decades... they've all been trying to solve the puzzle. It's just the Beltline has exacerbated the problem and accelerated the need for action. So, it's just so obvious and it's so in front of you that what they've been saying would happen has happened…So they were shouting, and people were barely hearing them. Then it took some amplified voices like public officials, [academics, and government agency staff]…some of us are now amplifying the voices of the people that have been saying this for years."

In this way, the Beltline's impacts on housing costs, advocacy surrounding the issue, and the amplification of the voices of housing advocates by public officials and others supported policy development to address the concerns. Notably, the policy's geographic area is limited to the areas within one half mile from the Beltline Corridor and four Westside Atlanta neighborhoods, including English Avenue, Vine City, Ashview Heights, and Atlanta University Center (City of Atlanta, n.d). The policy's focus on a green infrastructure project associated with gentrification concerns and a smaller subset of neighborhoods allowed it to be implemented more quickly and to potentially serve as a

model for a future citywide ordinance. As one nonprofit leader who advocated for the policy described,

> "Even at a city level, doing stuff citywide is a heavy, heavy lift, right? So, one of the reasons it's great having a focus on four neighborhoods is that if we wait around to get citywide getting something done, we'll still be in freaking meetings."

In addition to the inclusionary zoning ordinance, Atlanta's Westside Anti-Displacement Tax Fund, a philanthropic fund developed by the nonprofit Westside Future Fund to provide grants to homeowners in Westside neighborhoods to cover increases in their property tax bills, was developed in response to new investment in the Westside neighborhoods. The program focuses on the Westside neighborhoods because of the new investments coming into the area, including parks and green infrastructure. As Kasim Reed, Atlanta's mayor at the time, described, the fund was designed to

> "help ensure that long-time residents get to share in the prosperity coming to the Westside, thanks to new infrastructure, new parks, more transit, the Atlanta BeltLine, and a surge in economic development."

Finally, in Washington, D.C., a Memorandum of Agreement between D.C. Water and the District of Columbia required the development of a certification program for green infrastructure construction and maintenance as well as the hiring of local residents on city green infrastructure projects.

10.3 Mediating Factors

While advocacy has supported the implementation of policies and strategies to address housing affordability concerns, several mediating factors shape the impacts of advocacy efforts.

10.3.1 Existing Social Capital

10.3.1.1 Neighborhood-Level Social Capital

Existing neighborhood-level social capital is important in shaping the formation of coalitions and groups advocating for green infrastructure implementation and policy change. Groups focused on neighborhood-level concerns surrounding the impacts of green infrastructure projects have supported the development of coalitions and served to atract outside resources. Atlanta has had a stronger presence of neighborhood-level grassroots organizations focused on green infrastructure, while environmental organizations in Washington, D.C. have tended to work at the city level, focusing on the Anacostia River in general rather than a specific set of neighborhoods.

Atlanta's Westside neighborhoods have had a strong presence of environmental justice organizations focusing on green infrastructure implementation. In particular, a strong base of grassroots environmental justice organizations such as the West Atlanta Watershed Alliance and ECO-Action beginning in the 1990s allowed for the formation of future coalition-building efforts such as the Proctor Creek Stewardship Council and the Atlanta Watershed Learning Network. WAWA and ECO-Action identified a need for education, community engagement, and leadership in decision-making. In response, the organizations developed these new groups and obtained funding to support them. Nonprofit environmental groups such as WAWA also supported the city's application for the Environmental Protection Agency's Urban Waters Federal Partnership by supplying data and sharing information, taking staff on watershed tours, and conducting listening sessions, with the goal of getting the Proctor Creek watershed selected as an Urban Waters Federal

Partnership location. The watershed was selected in 2013, and WAWA's education director was selected as the Urban Water Ambassador for Proctor Creek. In this way, the existence of a strong base of grassroots environmental justice organizations has supported further advocacy and coalition-building surrounding green infrastructure implementation.

The Ward 8 neighborhoods of Washington, D.C. have had less of a presence of neighborhood-level environmental justice groups focusing on green infrastructure. At the city level, groups such as the Anacostia Riverfront Trust, Anacostia Riverkeeper, Anacostia Watershed Society, and Groundwork D.C. have focused on the cleanup of the Anacostia River. While the majority of these organizations focus primarily on the cleanup of the river itself, the Anacostia Riverfront Trust has also focused on displacement and equitable development concerns specific to neighborhoods in Wards 7 and 8 in recent years. The Anacostia River was selected as an Urban Waters Federal Partnership site in 2011, and the Anacostia Waterfront Trust was selected to house the partnership's Urban Waters ambassador. In 2015, the organization convened the Anacostia Park and Community Collaborative (APCC), which focuses on supporting community-led equitable development in the neighborhoods adjacent to the Anacostia River in addition to achieving a thorough cleanup of the river itself. APCC has thus far focused primarily on providing educational opportunities and building capacity of member organizations, and the nascent organization is still in the process of determining its purpose and function (Anacostia Park and Community Collaborative, 2018).

In this way, relative to the Ward 8 neighborhoods, the Atlanta Westside neighborhoods have had a stronger foundation and longer history of grassroots environmental organizations working at the neighborhood level. While in the Ward 8

neighborhoods, APCC is beginning to serve as a neighborhood-level advocacy group surrounding green infrastructure and neighborhood-level concerns, organizations such as WAWA have been working to address neighborhood-level environmental justice concerns since the 1990s, which has supported them in acting as a voice for neighborhood concerns in green infrastructure planning efforts. While APCC has participated in larger planning efforts since its development in 2015, the fact that the organization is still in early stages of development and is still determining its role may mean that will play less of a leadership role in these planning processes.

10.3.1.2 Agency-Level Social Capital

Relative to efforts surrounding Atlanta's Proctor Creek watershed, Washington, D.C has a longer history of agency collaboration surrounding green infrastructure concerns focused on the Anacostia River. Major partnerships focused on the Anacostia River include the Anacostia Waterfront Initiative, formed in 2000; the Anacostia Watershed Restoration Partnership, founded in 2006; and the Leadership Council for a Cleaner Anacostia River, formed in 2014. Atlanta's agency-level collaboration surrounding green infrastructure and the Proctor Creek Watershed has been more recent, with the development of the city's Green Infrastructure Task Force in 2012 and the Environmental Protection Agency's Urban Waters Federal Partnership effort, which began in 2013.

10.3.2 Project Scale and Predicted Impacts

The scale of green infrastructure projects and their associated predicted impacts on land and housing values and costs were important in shaping whether green infrastructure projects supported coalition-building, advocacy, or policy development and change around

housing affordability and community benefits concerns. Larger-scale projects such as the Atlanta Beltine and the 11th Street Bridge Park projects were more likely than smaller projects to catalyze groups within or outside of project planning processes to engage in analysis of project impacts and to advocate for or implement policies and programs to address predicted or measured impacts. Leadership of these projects were also more likely to recognize their potential impacts on land and housing values, while leadership in smaller projects frequently noted that other larger projects would constitute more of a concern for gentrification and displacement. As one park non-profit leader described,

> "I make the analogy of Cadillac parks and Chevrolet parks, that we you know... Cook Park is a Cadillac Park, it's the example, that when your out of town visitors come, and you wanna show them something really amazing, much like Historic Fourth Ward, that's where you'll go. But it's also those…that [are] going to create much more displacement than what we're trying to do at Boone Park West, which is something that's looking at the needs for the community to make more of a neighborhood park. And so, all green space is not all equal in terms of its impact on gentrification."

In this way, the view that larger investments in green infrastructure have greater potential impacts on housing costs may lead groups responsible for smaller green infrastructure planning efforts to be less concerned about a project's potential impacts with regard to housing costs, and less likely to take action surrounding such concerns.

10.3.3 Existing Policies and Limits of New Policies

The existing policy environment and limitations of new policies also shape the ability of advocacy efforts to support effective policy implementation. While the role of policy context will be discussed in the next chapter, it is important to note here that policies targeting limited areas of concern and those implemented in an environment of limited supportive policies in other areas of concern may support desired outcomes. Atlanta's

Beltline/ Westside Inclusionary Zoning Ordinance presents an interesting example. The ordinance is limited by its geographic extent (properties within one half mile of the Beltline and four Westside neighborhoods) and by its focus on rental units only. A lack of other policies supportive of housing affordability in Atlanta has meant that for-sale units are not required to meet affordability requirements, and developers may shift toward the construction of these units within the inclusionary zoning boundaries. In this way, a lack of existing policy addressing a variety of aspects of housing affordability and limitations in newly-developed policies may leave gaps, and a more comprehensive set of policies is needed.

10.4 Discussion

This chapter examined the role of social capital developed within and outside of green infrastructure planning processes in driving advocacy and the development of policies and strategies to address housing affordability and community benefits concerns. Social capital developed around green infrastructure supported coalition building and advocacy regarding 1) support for the implementation of green infrastructure projects and 2) advocacy for policy change surrounding housing affordability and community benefits concerns. It also drove the development of policies and strategies to address housing affordability and community benefits concerns, which often focused efforts on the specific impacts of green infrastructure projects.

The evidence presented in this chapter addresses Hypothesis 4: *Increases in social capital among actors internal to neighborhoods surrounding issues of housing affordability, gentrification, and community benefits concerns will lead actors external to*

neighborhoods to develop and implement policies and strategies to address these concerns. The study found that green infrastructure has served as a catalyst for coalition building and advocacy surrounding the implementation of green infrastructure to address environmental justice threats and promote environmental amenities. Groups such as the Proctor Creek Stewardship Council, the Atlanta Watershed Learning Network, and the Anacostia Park and Community Collaborative formed to focus community advocacy on green infrastructure implementation and to address the opportunities and threats posed by projects. Further, the implementation of specific projects, such as the Atlanta Beltline, was often driven by coalitions built at the neighborhood level in support of project implementation.

Social capital also formed to support for policy change surrounding issues of housing affordability and community benefits, with coalitions and advocacy frequently focusing advocacy efforts on the impacts of green infrastructure projects. Outside of project planning efforts, groups such as the Housing Justice League in Atlanta have focused housing affordability advocacy on the impacts of green infrastructure projects, with projects serving as focus point on which groups' concerns surrounding housing affordability can be legitimized. Within green infrastructure planning efforts, coalitions have also advocated for policy change at the city level to address housing affordability concerns in general as well as the impacts of specific projects.

In several cases, advocacy at the neighborhood level for policy change surrounding housing affordability and community benefits concerns associated with green infrastructure projects has led city leaders to develop policies and strategies aiming to address these concerns. These policies and strategies, such as the Beltline/ Westside

Inclusionary Zoning Ordinance in Atlanta and D.C. Water's Green Jobs M.O.A., have often focused specifically on the impacts of large green infrastructure projects. Yet, while some policies and strategies have been developed, strategies have generally been put in place slowly, particularly in Atlanta, which is continuing to develop basic housing affordability policies and funding mechanisms. This lack of policies in Atlanta and the limitations of newly-implemented policies such as the spatially-constrained inclusionary zoning ordinance have meant that the work of advocacy groups and coalitions continues to focus on the implementation of basic policies and funding mechanisms. In contrast, Washington, D.C. has a strong foundation of affordable housing policies and funding mechanisms, and newly-developed policies and strategies, such as the Douglass Community Land Trust, have been able to build off of these existing policies and funding mechanisms.

CHAPTER 11. HOW POLITICAL CONTEXT SHAPES THE ROLE OF SOCIAL CAPITAL

Previous chapters examined the role of social capital in shaping green infrastructure projects and their planning processes, and its role in shaping policy development and advocacy surrounding green infrastructure projects and issues of housing affordability and community benefits. The political context in which these processes take place is also an important consideration in assessing the role of social capital in supporting more equitable outcomes around green infrastructure projects.

This chapter addresses the research question *What role do state and local policy context play in affecting the ability of project-, neighborhood, and city-level actors to develop and implement policies and strategies addressing housing affordability, gentrification and displacement, and community benefits concerns?* In particular, this chapter responds to Hypothesis 5: *State and city-level political and policy support of housing affordability, gentrification and displacement, and community benefits concerns will strengthen neighborhood and project-level actors' capacities to develop and implement strategies in these areas.*

As the following sections describe, political context shapes the work of neighborhood- and project-level actors in several ways:

- First, city-level policies and funding in support of housing affordability directly shape neighborhood and project-level actors' capacities to develop and implement strategies in these areas. Section 11.1 examines how policies and funding in support

of nonprofit housing and neighborhood-level groups can support the development of social capital.

- Political context also shapes cities' institutional context, as policies and funding can support a rich environment of nonprofit housing developers and other neighborhood-level groups working to address equitable development concerns, thus increasing the potential for project-level actors to collaborate with these groups. Section 11.2 examines the role of cities' institutional contexts in supporting or inhibiting the development of social capital.
- Plans and policies can also create legal requirements surrounding housing affordability and community benefits that provide a foundation for the development of social capital around these concerns. Section 11.3 examines how plans and policies can support the development of social capital at the project level by creating legal requirements in support of housing affordability.
- Existing plans, policies and programs also shape the focus and role of advocacy groups, as groups working in weaker political contexts must focus on the development of basic policies surrounding housing affordability and community benefits concerns. Section 11.4 examines how political context shapes the role and focus of housing advocacy groups.
- Finally, in Atlanta, state-level policy shapes the ability of the municipality to implement city-level policy addressing these concerns. Section 11.5 examines how state-level policy may inhibit the development of policy at the municipal level.

The following sections discuss these impacts in greater detail.

11.1 Directly Supporting the Work of Neighborhood-Level Groups through Policies and Funding Mechanisms

First, the cities' existing housing affordability policies and funding sources directly impact nonprofit housing developers and neighborhood-level groups' efforts to promote housing affordability. Washington, D.C. has a greater number and more supportive affordability policies and funding mechanisms in place than Atlanta. As shown in Tables 7 and 8, the development of affordable housing policies and strategies in Washington, D.C. dates back several decades, while their development in Atlanta has been more recent. Importantly, Washington, D.C.'s Housing Production Trust Fund provides a significant funding source for the development of affordable housing in the city. Since 2015, the fund has provided $100 million or more each year for affordable housing development.

Table 8: Washington, D.C.'s Major Policies and Programs Targeting Housing Affordability

Policy/ Program	Description	Year Developed
Tenant Opportunity to Purchase Act	Provides tenants the first opportunity to purchase the building they live in when a landlord wants to sell the property. Tenants must be notified of their rights to purchase when the landlord is ready to sell the property.	1980
Rent Control	Sets the amount by which units may increase in rent each year	1985
Housing Production Trust Fund	Fund for production of affordable housing. In 2015, Mayor Muriel Bowser began a $100 million annual commitment to the fund. To date, the fund has created more than 9,000 units of affordable housing.	1988 (first received regular funding in 2001)
Inclusionary Zoning	Requires production of affordable units in all new residential development	2006 (finalized in 2009)

District Opportunity to Purchase Act	Requires rental property owners to provide the District with the opportunity to purchase properties with 5 or more units, if 25 percent or more of units are affordable. The District's ability to purchase is subordinate to tenants' opportunity to purchase under TOPA. This act has not been implemented.	2008
Public Land Requirement	Requires new residential developments on city owned land to include an affordable housing component	2014
Housing Preservation Fund	Funding to preserve existing affordable housing. Approved by the city council for $10 million in the 2017 and 2018 budgets	2017

Table 9: Atlanta's Major Policies and Programs Targeting Housing Affordability

Policy/ Program	**Description**	**Year Developed**
First issuance of Housing Opportunity Bond	Bond issuance of $35 million for workforce housing development at or below 120% of AMI	2007
Beltline Affordable Housing Trust Fund and Bond Issue	The Beltline's first bond issue in 2008 generated $8.2 million for the Beltline Affordable Housing Trust Fund. The trust fund's goal is to create 5,600 units of affordable housing	2008
Workforce Housing Policy	Requires real estate developers receiving grants, incentives or subsidies from taxpayers or through an economic development authority operating in the city, to set aside 15 percent of total residential units for household income levels below 80 percent area median income or 10 percent of total residential units for income levels below 60 percent area median income.	2016
Second issuance of Housing Opportunity Bond	Bond issuance of $40 million to serve households at 60% - 80% of AMI and below	2017
Westside Future Fund Antidisplacement Tax Fund	In specified Westside neighborhoods, pays qualifying homeowners' property tax	2017

Beltline/ Westside Inclusionary Zoning	For housing within the Beltline/ Westside boundary, requires developers to make 10 percent of units affordable (up to 30% of monthly income) to 60 percent AMI or 15 percent of units to 80 percent AMI or to pay an in-lieu fee to an affordable housing trust fund	2018

In Washington, D.C., strong coalitions of actors focused on housing affordability have supported the development of the city's strong policy environment over several decades. In turn, the city's policy environment and a consistent funding source for affordable housing development have supported an abundance of nonprofit affordable housing organizations and developers, as well as advocacy groups and coalitions in taking actions at the neighborhood level. These groups have advocated for the development of policies and strategies to support housing affordability for several decades, contributing to Washington, D.C.'s strong policies around housing affordability. In contrast, in Atlanta, the lack of a consistent funding source and policies in support of affordable housing has meant that the city has had a less robust community of nonprofit affordable housing developers than Washington, D.C.

DC's affordable housing policies and nonprofit developers have supported neighborhood-level groups in developing strategies to address housing affordability concerns. For example, Building Bridges Across the River partnered with Enterprise Community Partners, a nonprofit housing organization, to develop the Douglass Community Land Trust for the impact area of the 11th Street Bridge Park. The land trust's advisory committee and the park organization leadership have also noted that the land trust

plans to utilize city policies and funding mechanisms such as the Housing Production Trust Fund and Tenant Opportunity to Purchase Act to acquire property and develop affordable housing. In contrast, Atlanta's lack of funding and supportive policies for housing affordability has meant that neighborhood-level groups have had less of a supportive foundation in building additional strategies to address these concerns. In this way, the cities' policy and funding environments provide a foundation for neighborhood-level groups and nonprofit housing organizations in developing additional housing affordability strategies.

11.2 Supporting Strong Institutional Contexts

Cities' institutional context, including the number and variety of nonprofit organizations, grassroots groups, and government-level agencies focused on addressing equitable development concerns, can support or inhibit the development of social capital at the project level. Projects within institutional contexts in which large numbers of actors are working to address equitable development concerns more easily build partnerships with the entities already working to address these concerns, while projects within weaker institutional contexts may find it challenging or impossible to build partnerships in addressing these concerns.

Washington, D.C. has a strong institutional context regarding government agencies and nonprofit organizations surrounding housing affordability and workforce development concerns. The Housing Association of Nonprofit Developers (HAND), the area's regional membership association for affordable housing development, was founded in 1991 and now has 340 members, including 102 nonprofit organizations (HAND, n.d.). The Coalition

for Nonprofit Housing and Economic Development, a member association supporting nonprofit housing and economic development, formed in 2000 and has 140 member organizations (Coalition for Nonprofit Housing and Economic Development, n.d.). This context has included a strong environment of nonprofit affordable housing organizations such as Mi Casa, Manna, and City First Enterprises, and the Coalition for Nonprofit Housing and Economic Development, as well as government staff and institutions, including a Deputy Mayor for Greater Economic Opportunity, an office devoted to workforce and small business development, particularly in wards 5, 6, 7, and 8, and in the city's Office of Planning, a Lead Planner for Equity Initiatives.

Relative to Washington, D.C., Atlanta has a small group of affordable housing advocacy organizations and developers. Georgia ACT, a state coalition of nonprofit housing and community development organizations, lists 22 member organizations from Atlanta. Coalitions of organizations have also formed surrounding housing affordability, including the Transformation Alliance, a partnership of government agencies, businesses, and nonprofits whose goals include supporting affordable housing surrounding transit in the Atlanta metro; City For All, a coalition formed to educate and mobilize citizens to press for legislation and resources to support housing affordability in advance of the city's 2017 elections; and the recently-developed HouseATL, a coalition of government agencies, nonprofit organizations, and grassroots groups focused on advancing affordable housing policy in the city. Notably, since HouseATL was formed as a more corporate-dominated coalition, the City for All coalition has not continued. The Housing Justice League, an advocacy organization focused on housing affordability, formed in 2015. Finally, Atlanta has a strong presence of corporate funders and philanthropic groups, such as the Arthur M.

Blank Family Foundation, many of which have financially supported green infrastructure planning efforts.

The institutional context of the cities has provided a foundation from which actors at the project level are able to engage with housing affordability and community benefits concerns. For example, Washington, D.C.'s rich environment of equity-focused nonprofit organizations meant that there existed a community-focused nonprofit, Building Bridges Across the River, in the neighborhoods surrounding the planned 11th Street Bridge Park, in which the park's planning activities could be housed. It further meant that when leadership for the project heard about residents' concerns surrounding housing affordability, workforce development, and small business development during planning processes, there were a variety of organizations available to partner with in addressing these concerns. The organization first partnered with the Local Initiatives Support Corporation (LISC D.C.) to get help in developing an Equitable Development Task Force that would lead the park's planning process around equitable development concerns. LISC also supported the project's equitable development goals by developing its own initiative in support of equitable development in the park's impact area, a $50 million investment in the surrounding neighborhoods called the Elevating Equity Initiative. In addition to the initial partnership with LISC, the city's institutional context provided Building Bridges Across with River with a variety of housing and workforce development-focused organizations that had already been doing work in the city to partner with in order to expand its equity-focused initiatives, as well as think tanks and research-focused groups, such as the Urban Institute and D.C. Fiscal Policy Institute, to partner with to support planning and evaluation efforts.

This example demonstrates the role of institutional context in providing a backdrop of organizations and agencies focused on housing affordability and community benefits concerns with which green infrastructure planning processes may interact with. In contrast to this example, in Atlanta, the more limited number of groups and coalitions focused on issues of housing affordability and workforce development has meant that in green infrastructure planning processes in which residents discuss these issues, there are more limited options for the organizations or agencies leading the projects to develop partnerships with outside organizations to address these concerns.

11.3 Creating Legal Requirements around Housing Affordability

In addition to shaping cities' institutional contexts, the municipal policy environment can support the development of social capital at the project level by creating legal requirements for projects around housing affordability and community benefits.

A primary example of this, D.C.'s Comprehensive Plan, which contains language around preventing gentrification and displacement, was cited by advocates in a lawsuit aimed at stopping new high-end development surrounding Poplar Point (Delgadillo, 2018). The advocates argued that the Zoning Commission's approval of the new development, called Columbian Quarter, violated the Comprehensive Plan by failing to account for possible gentrification and displacement. In this way, strong plans and policies can support the development of social capital at the project level, as advocates are able to argue that projects are not meeting requirements surrounding housing affordability and community benefits.

While most green infrastructure projects do not include a housing component as Poplar Point does, requirements around other components, such as jobs and workforce development, can provide a basis for advocacy groups in ensuring that social equity goals are met. For example, D.C. Water's Green Jobs M.O.A. includes requirements for the agency's projects surrounding local hiring and workforce development, including the development of a green infrastructure certification body to provide training for the local workforce in green infrastructure construction and maintenance. Legal requirements such as this can provide a legal basis for advocacy groups in challenging projects that do not meet legal requirements, as advocacy groups have done in the case of Poplar Point.

11.4 Shaping the Focus and Role of Advocacy Groups

Strong existing policies in Washington, D.C. have allowed housing advocates to focus on ensuring that these policies and funding are implemented and working as envisioned. For example, advocates have pointed out that current tools benefit middle-income residents over the lowest-income households and have criticized the District for not targeting sufficient resources to extremely low-income renters, or those who make less than 30% of area median income (Zippel, 2018).

In contrast, Atlanta advocates have focused on supporting the implementation of basic affordable housing policies, as the city has not had a strong policy foundation in place. These efforts have included advocating for policy platforms and the expansion of existing policies, as well as elevating housing affordability as an issue in the city's elections. Platforms and recommendations for policies and funding mechanisms to

improve housing affordability in this city have included recommendations for funding, policy, and community engagement.

For example, the City for All coalition's affordable housing platform includes recommendations for the development of a housing trust fund, the expansion of the city's current Beltline/ Westside inclusionary zoning ordinance to a citywide ordinance, the use of community land trusts as an affordable housing preservation tool, and the use of a variety of strategies to prevent involuntary displacement from changing neighborhoods (City for All, 2017). The House ATL coalition also put forth a set of recommendations to support housing affordability, including the investment of $1 billion in public and private resources in affordable housing; implementation of anti-displacement strategies; strategies to coordinate funding and support coordination across agencies; and strategies for community engagement and education (House ATL, 2018). The Housing Justice League's Beltline report includes several similar recommendations to preserve existing affordable housing, create new affordable housing, and focus housing assistance programs on low-income renters (Housing Justice League, 2017). Notably, many recommendations in these platforms are similar to policies and strategies already in place in Washington, D.C., including a citywide mandatory inclusionary zoning ordinance, a housing production trust fund, and a first right of refusal policy similar to Washington, D.C.'s Tenant Opportunity to Purchase Act.

In addition to developing policy platforms and recommendations, Atlanta advocates also focused on making affordable housing a primary issue in the 2017 mayoral race, including hosting candidate forums on housing affordability. The focus on housing

affordability in the election led candidate Keisha Lance Bottoms to make a $1 billion commitment to housing affordability. The mayor's term began in 2018.

11.5 State-Level Policy and Concerns for Municipal Policy Development

Finally, state policies impact the ability of municipalities to implement city-level policy. While Washington, D.C. does not have to consider a state-level government in its policy development, Atlanta does. For example, the Official Code of the State of Georgia prohibits rent control (O.C.G.A. §44-7-19) and restricts the use of impact fees in development (O.C.G.A. §36-71). Factors such as these create a state-level legal environment in which local affordable housing policies, such as inclusionary zoning, could face challenges at the state level if implemented locally. Some interviewees described concerns regarding the city's BeltLine Westside inclusionary zoning ordinance facing challenges at the state level for conflicting with the state ban on rent control, although as of yet the policy has not faced challenges in state courts.

11.6 Discussion

This chapter addresses the research question *What role do state and local policy context play in affecting the ability of project-, neighborhood-, and city-level actors to develop and implement policies and strategies addressing housing affordability, gentrification and displacement, and community benefits concerns?* In particular, this chapter responds to Hypothesis 5: *State and city-level political and policy support of housing affordability, gentrification and displacement, and community benefits concerns will strengthen neighborhood and project-level actors' capacities to develop and implement strategies in these areas.*

The chapter showed how city- and state-level political context can shape neighborhood and project-level actors by:

- Providing policies and funding sources that directly supported the work of these groups, such as Washington, D.C.'s Tenant Opportunity to Purchase Act and Housing Production Trust Fund, which the 11th Street Bridge Park's Douglass Community Land Trust plans to utilize
- Supporting institutional contexts with large numbers of actors working on housing affordability concerns, which increased the potential for collaboration of green infrastructure projects with these groups and thus shaped the ways in which housing affordability was incorporated into projects
- Creating legal requirements for the incorporation of housing affordability and community benefits components into projects and planning processes, and
- Shaping the focus and role of advocacy groups in either building basic housing affordability policies or tailoring existing policies to have desired impacts

Further, state-level policies, such as Georgia's ban on rent control, can limit the development of municipal policies in support of housing affordability.

As evidenced by the research, city and state political context shape the potential for neighborhood- and project-level actors to implement strategies to address housing affordability and community benefits concerns. Notably, political context, including policies, funding sources, and general support for the implementation of policies and strategies focused on housing affordability, can support the work of neighborhood-level actors such as nonprofit affordable housing developers in doing work focused on housing

affordability. In this way, political context can strengthen cities' institutional contexts by supporting environments in which large numbers of actors are working in housing affordability because of the available funding and supportive policies. Within the case cities, Washington, D.C.'s stronger housing affordability policies and funding mechanisms supported a dense environment of nonprofit housing developers and organizations, while Atlanta's weaker policy environment and funding sources did not support the work of these groups to the same extent. At the same time, existing organizations and coalitions shaped the cities' political contexts around housing affordability by supporting the further development of policies and strategies.

Of importance for this research, the cities' political and institutional contexts shaped the potential for green infrastructure projects to connect with organizations working on housing affordability and community benefits concerns and to incorporate these concerns into projects. As described in this chapter, Washington, D.C.'s supportive political and institutional contexts with regard to housing affordability meant that the 11th Street Bridge Park project could plan to use the city's existing policies and funding sources in the development of its community land trust, and also that there existed a greater variety of organizations focused on housing affordability that the park project could partner with to support its work in this area. In this way, policies and funding mechanisms shaped the institutional contexts in which organizations and agencies planned and implemented green infrastructure projects, which shaped the ways in which projects were able to incorporate social equity concerns. Existing policies can also provide a legal basis for challenging projects that don't meet requirements in areas such as limiting displacement of low-income

residents, as has been the case with development surrounding the Poplar Point waterfront park in Washington, D.C.

In addition to shaping the development of social capital around housing affordability and community benefits at the project level, political context can support housing affordability and community benefits goals more broadly, which is important given the limitations for social capital developed at the project level in supporting equitable outcomes discussed in Chapter 9. For example, policies and funding mechanisms that require or facilitate the development of affordable housing, such as Washington, D.C.'s Housing Production Trust Fund and citywide inclusionary zoning ordinance, can support affordable housing development across the city rather than at the scale of the individual green infrastructure project.

Overall, while the findings of the research support the importance of political context in shaping the work of groups at the project and neighborhood level, they also emphasize the importance of policies and strategies in their own right for driving equitable development at a broader scale than the individual green infrastructure project. As social capital as several limitations in achieving equitable outcomes at the level of the individual green infrastructure project, as discussed in Chapter 9, the research highlights the need for strong citywide policy surrounding issues of housing affordability and community benefits to ensure equitable development is addressed at a larger scale.

CHAPTER 12. CONCLUSION AND RECOMMENDATIONS FOR PLANNING AND POLICY

The research advances the green infrastructure, environmental gentrification, and social capital literatures by examining the mechanisms through which green infrastructure planning can support the development of social capital and through which social capital can in turn shape green infrastructure projects and planning processes. The study's findings support several recommendations for policy and planning and indicate opportunities for future research.

12.1 Review of Dissertation Questions and Approach

The dissertation hypothesized that:

- Green infrastructure planning processes increase social capital amongst neighborhood residents and stakeholders.
- The planning for green infrastructure projects within economically depressed communities vulnerable to gentrification serves as both a threat and an opportunity that lead to coalition building and information sharing among community stakeholders around issues of housing affordability, gentrification, and community benefits concerns.
- Increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these projects and their planning processes.

- Increases in social capital among actors internal to neighborhoods surrounding issues of housing affordability, gentrification, and community benefits concerns will lead actors external to neighborhoods to develop and implement policies and strategies to address these concerns.
- State and city-level political and policy support of housing affordability, gentrification and displacement, and community benefits concerns will strengthen neighborhood and project-level actors' capacities to develop and implement strategies in these areas.

These hypotheses were based on an extensive literature review focused on green infrastructure and social capital. The literature review identified relationships between green infrastructure and environment and health qualities and between green infrastructure and land and housing markets, noting that the unmitigated interaction of these components may lead to increases in land and housing values surrounding new investments in green infrastructure as environmental qualities improve, leading to environmental gentrification and the potential for the displacement of low-income residents from their neighborhoods. It also indicated a role for social capital in both shaping projects themselves to incorporate housing affordability and community benefits concerns, and in supporting the development of policies and strategies addressing housing affordability and community benefits. Chapter 2 presented theories of social capital and collaborative processes and their impacts, and detailed the literature surrounding the impact of green infrastructure on social capital and the impact of social

capital and collaborative processes on green infrastructure planning. It further presented the gaps in existing research and the implications of those gaps for the dissertation.

To test the hypotheses, the dissertation used a qualitative case study approach, based on coding of in-depth interviews, document analysis, and participation observation. This approach supported the study in clarifying the mechanisms through which green infrastructure supports the development of social capital, and through which social capital developed both within and outside green infrastructure planning processes shape green infrastructure projects and the institutionalization of policies and strategies to address housing affordability and community benefits concerns. In particular, the study aimed to increase clarity around questions of:

- how green infrastructure planning processes might be designed to support the development of social capital in communities, including the building of relationships and trust, and networks of communication;
- how social capital developed within and outside of green infrastructure planning processes can shape projects themselves to address equitable development concerns, as well as shape the development of policies and strategies around housing affordability and community benefits;
- and the role of political context in shaping equitable outcomes around green infrastructure.

Chapters 7 to 11 addressed these questions and the research hypotheses, detailing the opportunities and threats posed by green infrastructure in low-income communities (Chapter 7), the mechanisms through which green infrastructure can serve to support the development of social capital (Chapter 8), the role of social capital in shaping green

infrastructure projects and planning processes (Chapter 9), the role of social capital in shaping policy development and advocacy focused on green infrastructure and issues of housing affordability and community benefits (Chapter 10), and the mechanisms through which city and state political context shape the potential for social capital to support more equitable development surrounding green infrastructure projects (Chapter 11). The following sections provide an overview of the findings presented in chapters 7 through 11 and present recommendations for planning and policy.

12.2 Conclusions

The dissertation uses a multiple case study approach to demonstrate the ways in which green infrastructure planning supports and in turn is shaped by social capital. The following sections summarize the study's findings and associated conclusions, which form the basis for the recommendations presented in Section 12.3.

12.2.1 The Opportunities and Threats Posed by Green Infrastructure in Low-Income Communities

First, the research points to the variety of opportunities and threats posed by green infrastructure in low-income communities. As detailed in chapter 7, interviewees associated a variety of opportunities and threats with green infrastructure planning and implementation. Opportunities associated with green infrastructure include environmental opportunities, such as addressing flooding and stormwater management concerns and restoring impaired waterways, as well as economic and social opportunities, such as developing new parks and neighborhood amenities in neighborhoods that lacked access, creating jobs and workforce development opportunities, and providing opportunities for

community leadership and engagement. Threats focused primarily on concerns surrounding gentrification and displacement, including the potential for displacement of current residents due to increases in housing costs, as well as cultural and political forms of displacement.

Overall, a variety of interviewees emphasized the environmental benefits of green infrastructure, which focused on addressing flooding and stormwater management issues and cleaning up impaired waterways. With regard to social and economic opportunities, park non-profit organizations and government agencies tended to focus planning processes on the benefits of providing access to parks and recreation opportunities, supporting neighborhood revitalization, and creating opportunities for community engagement, while these groups' discussions of issues of jobs, workforce development, and housing affordability were generally driven by residents' emphasis of the importance of these issues during planning processes. Overall, perspectives on the opportunities and threats associated with green infrastructure varied by whether interviewees were involved with planning of green infrastructure projects or were residents of neighborhoods in which projects were being implemented.

Notably, interviewees from park non-profit organizations and government agencies focused primarily on the benefits of green infrastructure, including addressing flooding and stormwater management, providing access to parks and recreation opportunities, supporting neighborhood revitalization, and creating opportunities for community leadership and engagement. Neighborhood residents and grassroots organizations also focused on these opportunities associated with green infrastructure; yet, interviewees in these categories were more likely to also express concerns around threats of displacement.

While park nonprofits and government agencies were also conscious of residents' concerns around displacement, they were more likely to emphasize the equity concerns associated with access to parks and greenspace over the threats of displacement. Meanwhile, residents who participated in park planning processes viewed the opportunities and threats of green infrastructure as more interconnected and thus often expressed desires that housing affordability and community benefits concerns be addressed in green infrastructure planning processes.

These co-occurring opportunities and threats illustrate the tensions and challenges associated with green infrastructure planning and implementation. While residents and community-led organizations often catalyzed or supported investments in green infrastructure in order to achieve a variety of goals from stormwater management to neighborhood revitalization, they also frequently framed projects in terms of potential negative impacts regarding gentrification and displacement. The variety of potential positive and negative impacts associated with green infrastructure projects was in part what drove the development of social capital surrounding these investments.

12.2.2 How Green Infrastructure Reinforces Social Capital

Next, the research provides insight into the mechanisms through which green infrastructure planning processes can support the development of social capital among residents and stakeholders. Green infrastructure planning processes and the opportunities and threats associated with projects have served as opportunities for the development of social capital, including the building of relationships, trust, behavioral norms, and networks of communication, and intellectual capital, including knowledge sharing and mutual

learning. Both within and outside of project planning processes, residents and community organizations engaged in coalition building, advocacy efforts, and knowledge sharing surrounding both the potential benefits and negative impacts associated with green infrastructure, including concerns surrounding housing affordability, displacement of existing residents, and community benefits. Projects in which interviewees discussed high levels of trust and strong relationships tended to have community engagement processes that were in-depth and flexible; to have higher levels of community leadership and control; and to devote higher levels of effort and resources to addressing goals identified by residents in planning processes.

Projects which supported strong networks tended to be those which attracted and provided opportunities for involvement for stakeholders with a variety of interests; had requirements for project funding and expertise that necessitated partnerships with outside organizations, agencies, and philanthropic groups; were willing to cross boundaries of typical green infrastructure concerns and prioritize those outside concerns; and added goals outside of green infrastructure project implementation, such as housing and workforce development, which required skills and resources already well-developed in existing community groups and organizations. Outside of project planning efforts, the potential opportunities and threats associated with green infrastructure has led to network-building focused on maximizing benefits for neighborhoods and addressing threats of displacement.

In addition to developing social capital, green infrastructure planning also supported the development of intellectual capital through the need for community input on public spaces; the need for technical knowledge in decision-making processes; and the existence of neighborhood concerns falling outside of green infrastructure project design.

In particular, the research highlights the fact that absent any standards for community engagement for green infrastructure projects, planning processes may exhibit a wide range of levels of community engagement. In this way, projects also varied with regard to the extent that they supported the development of social capital by building relationships and trust and developing strong networks across stakeholders and residents. Some projects and planning processes prioritized and actively built relationships, trust, and networks, while others increased distrust through a lack of community engagement or a failure to prioritize concerns raised by communities during planning processes. Even in projects that initially supported high levels of social capital around project implementation, a failure to prioritize and implement residents' goals outside of green infrastructure project design led to increased distrust.

The research also demonstrates that the opportunities and threats associated with green infrastructure catalyzed coalition building and knowledge focused on the impacts of projects, including issues of housing affordability and community benefits. Outside of green infrastructure planning processes, the building of networks of communication was driven by the multiple benefits and threats associated with green infrastructure, with organizations forming with the goal of maximizing the benefits associated with projects while minimizing threats related to gentrification and displacement. Further, the need for community leadership on green infrastructure challenges supported the development of intellectual capital by catalyzing the formation of these organizations devoted to knowledge sharing surrounding environmental justice threats and the benefits of green infrastructure.

12.2.3 The Role of Social Capital in Shaping Green Infrastructure Projects and Planning Processes

Next, the research demonstrated that social capital developed in green infrastructure planning efforts has shaped green infrastructure projects and planning processes through shaping projects themselves, expanding green infrastructure planning processes to incorporate equitable development concerns, and supporting change at an organizational level. While community engagement frequently shaped projects to incorporate new elements or amenities desired by residents and stakeholders, the expansion of green infrastructure planning processes to incorporate concerns outside of project design and amenities was less common. Green infrastructure planning processes which expanded to encompass equitable development concerns outside of project design tended be processes with high levels of knowledge sharing and in-depth community engagement, connections to outside groups and funders, and flexible project leadership committed to addressing concerns discussed by residents in planning processes. Green infrastructure planning processes in the case cities expanded to include components such as housing affordability, jobs and workforce development, and small business development. However, the research noted that these components were usually incorporated at the project level in small ways, if at all, and that concerns remain with regard to the ability of organizations to implement strategies quickly enough to address quickly changing market forces.

First, social capital can shape green infrastructure projects directly if projects incorporate concerns discussed by residents in planning processes. In this way, social capital can physically shape projects through the incorporation of design elements or amenities that reflect the interests and needs of residents, including incorporating elements

focused on achieving goals related to social equity concerns. As green infrastructure planning processes typically began with a focus on project design and amenities, the physical aspects of projects were a primary way in which residents and community organizations could shape how investments in green infrastructure would impact their communities. The inclusion of specific design elements or amenities in projects supported community benefits including providing community gathering, cultural, and educational spaces; building connections to green infrastructure projects such as trails in low-income communities; using specific green infrastructure techniques to support residents' design goals for their communities; and including design elements to address social and economic issues.

In contrast, the expansion of green infrastructure planning processes to address issues outside of project design, such as housing affordability and workforce development, was less common, only occurring in a few projects in the case neighborhoods. The study found that these additional elements were more likely to be incorporated into projects with high levels of knowledge sharing, community engagement, and community leadership in planning processes, larger networks with greater numbers of connections to outside groups, and the commitment and flexibility of project leadership to ensuring projects met neighborhood goals. In this way, the ability of social capital to expand green infrastructure planning processes to incorporate additional areas of concern was limited by the organization or agencies' ability and willingness to engage areas outside of project design.

In addition to shaping green infrastructure projects and their planning processes, social capital also drove change at an organizational level. Organizational change occurred when organizations and agencies leading green infrastructure projects expanded their areas

of focus at an organizational level to encompass housing affordability and/or community benefits concerns, and when organizations implemented changes in staff to address housing affordability and community benefits concerns surrounding projects. Social capital developed around green infrastructure also supported the creation of new organizations focused on the opportunities and threats posed by green infrastructure in low-income communities. These organizational changes have the potential to shape current and future green infrastructure projects regarding the incorporation of housing affordability, community benefits, and other social equity concerns surrounding green infrastructure projects.

While planning processes sometimes led to the inclusion of housing affordability and community benefits concerns in projects and planning processes, or to organizational changes, multiple barriers existed for social capital to support the incorporation of these concerns. First, most green infrastructure projects in the case neighborhoods were led by environmental organizations or park nonprofits with a narrow focus on parks or stormwater management, which did not consider housing affordability or workforce development as significant components of their missions. In rare occasions when these outside components were included in projects or plans, they have often been incorporated into projects in limited ways or with a slower timeframe than would allow them to adequately respond to quickly-changing market dynamics. Further, when housing or workforce development goals have been incorporated into plan documents, they have often not been prioritized in implementation regarding devotion of staff and resources. Although projects frequently exhibited these limitations regarding incorporating housing or workforce development concerns, interviewees described the potential for smaller projects that incorporated these

components to serve as models for citywide projects or programs, and nonprofit groups and coalitions have pushed city agencies to expand and extend smaller project-level efforts to become citywide programs or requirements.

Finally, the structure and funding of green infrastructure organizations also constitutes an important mediating factor regarding the potential for social capital to shape green infrastructure projects and planning processes with regard to the incorporation of housing and affordability and community benefits concerns.

Overall, the research complicates the hypothesis that increases in social capital around green infrastructure planning will lead to increased incorporation of issues of housing affordability, gentrification, and community benefits concerns into these projects and their planning processes. Project planning processes that included the most extensive community engagement, connections to outside groups, and flexible project leadership committed to meeting community needs were most likely to expand their planning processes in this way. Yet, even in these cases, significant limitations exist regarding the ability of social capital to support the incorporation and implementation of housing affordability and community benefits elements.

12.2.4 The Role of Social Capital in Shaping Policy Development and Advocacy Tied to Green Infrastructure

In addition to shaping green infrastructure projects directly, social capital developed around green infrastructure also drove the development of policies and advocacy focused on housing affordability, gentrification, and displacement. The opportunities and threats associated with green infrastructure catalyzed coalition building and advocacy, as

groups formed or tailored their advocacy efforts in support of both green infrastructure implementation and the development of policies and strategies to address housing affordability and community benefits concerns. Green infrastructure also served as a focus for the development of policies and strategies focused on social equity concerns, with policies such as the BeltLine/ Westside Inclusionary Zoning Ordinance in Atlanta and the Green Jobs MOA in Washington, D.C. framing their housing affordability and community benefits policies and strategies around green infrastructure projects.

The ways in which social capital supported the development of policies and advocacy was mediated by factors including existing social capital in the case cities, the scale and predicted impacts of green infrastructure projects, and existing policies and limitations of new policies in the case cities and neighborhoods. While some policies and strategies have been developed, they have generally been put in place slowly, particularly in Atlanta, which is continuing to develop basic housing affordability policies and funding mechanisms. This lack of policies in Atlanta and the limitations of newly-implemented policies such as the spatially-constrained inclusionary zoning ordinance have meant that the work of advocacy groups and coalitions continues to focus on the implementation of basic policies and funding mechanisms. In contrast, Washington, D.C. has a strong foundation of affordable housing policies and funding mechanisms, and newly-developed policies and strategies, such as the Douglass Community Land Trust, have been able to build off of these existing policies and funding mechanisms.

Importantly, the research demonstrates that in addition to shaping green infrastructure projects and their planning processes, social capital developed around green infrastructure can catalyze coalition building and advocacy to address social equity

concerns, as well as provide a specific focus for the efforts of advocacy groups focusing on equitable development concerns. In this way, in contrast to advocating around concerns such as housing affordability more broadly, groups may effectively focus their advocacy efforts on green infrastructure projects that have created concerns around housing affordability and community benefits.

The development of housing affordability and community benefits policies and strategies in the case cities that focus on the impacts of green infrastructure projects illustrates the potential for projects to spur conversations and action around equitable development concerns. While in some cases, policies and strategies have been developed at a small scale or covering a narrow geographic area, there exists the potential for the expansion of initial concepts to expand. For example, Atlanta's Beltline/ Westside Inclusionary Zoning Ordinance, while initially developed to focus on the impacts of the Beltline and development in the Westside neighborhoods, may eventually be expanded to a citywide ordinance.

12.2.5 How Political Context Shapes the Role of Social Capital

Finally, the findings of the study highlight the important role of city and state political context in shaping outcomes of green infrastructure projects. While social capital developed at the project level shaped green infrastructure projects and sometimes led to the expansion of planning processes or change at the organizational level, outcomes varied by project with regard to pressure from residents and community groups, the level of community engagement, connections to outside groups and resources, and the commitment of project leadership to addressing residents' concerns. Further, social capital developed at

the project level had several limitations in its ability to support equitable outcomes, including the narrow focus of organizations leading green infrastructure planning efforts, the incorporation of equitable development concerns into projects or plans in limited ways, slow speed of implementation in the face of quickly-changing market dynamics, and a lack of implementation of goals included in plan documents.

Because of the limitations of social capital at the project level in supporting equitable outcomes, strong city and state political contexts around issues of housing affordability and community benefits are needed to shape outcomes at a broader level than the individual project. In addition to supporting equitable outcomes more broadly, the political context of the case cities provides an important foundation for the ability of neighborhood-level groups and project-level actors in developing strategies to address equitable development concerns.

Strong political contexts, including institutions and existing policies and strategies focused on issues of housing affordability and community benefits, can support the work of neighborhood-level groups, facilitate the building of partnerships among institutions, provide a legal basis for challenging projects that do not meet requirements around social equity concerns, and shape the role and focus of advocacy groups. In this way, political context drives the development of social capital around issues of equity, and social capital in turn can further strengthen political context by supporting housing affordability and community benefits policies, strategies, and funding mechanisms.

12.3 Recommendations for Policy and Planning

This dissertation was developed with the goal of supporting more equitable outcomes in green infrastructure planning, including mitigating impacts of environmental gentrification and displacement, as well as supporting community wellbeing and empowerment. These recommendations are designed to support these goals and include strategies for developing social capital within green infrastructure planning processes and for shaping projects to address equitable development concerns outside of project design. Further, since the study found that significant limitations exist for social capital at the level of the individual project in supporting equitable outcomes, the recommendations also focus on the development of city and state political contexts to support goals such as housing affordability and workforce development at a broader scale than the project level. While these recommendations focus on green infrastructure planning efforts, they have applicability for a variety of planning efforts focused on the addition of environmental or other amenities to low-income communities susceptible to gentrification and displacement, and in which other concerns such as housing affordability are prominent.

12.3.1 Recommendations for Planners and Leaders of Green Infrastructure Planning Processes

12.3.1.1 Design Green Infrastructure Planning Processes to Support Mutual Learning Around Opportunities and Threats

First, planning processes designed to support knowledge sharing and mutual learning around the opportunities and threats posed by green infrastructure projects can support the development of social and intellectual capital, which, in the projects examined in this study, led to additional incorporation of equitable development concerns outside of

project design into projects and their planning processes. The variety of opportunities and threats that residents and stakeholders associated with green infrastructure suggest benefits associated with designing planning processes to uncover the interests, needs, and fears that individuals and groups associate with green projects and their planning processes.

Of the green infrastructure planning processes examined in the case study neighborhoods, projects that provided the greatest opportunities for community engagement, including knowledge sharing and mutual learning surrounding opportunities and threats, incorporated these concerns into projects and planning efforts to the greatest extent, as detailed in Chapter 9. Although the study suggests several limitations associated with the incorporation of housing affordability and community benefits concerns into projects and their planning efforts, the fact that some projects made extensive efforts to engage communities around these concerns and to incorporate them into projects and planning efforts suggests the importance of in-depth community engagement processes around green infrastructure as a strategy to support projects in addressing equitable development concerns more holistically.

To better understand these opportunities and threats and address them in planning processes and implementation, planners and leaders of green infrastructure planning processes should design processes with a goal of mutual learning surrounding the implications of green infrastructure in low-income communities. Processes such as principled negotiation, community dialogues, and facilitation, which focus on understanding the interests and needs behind the positions of different stakeholders, can help support learning about how participants in planning processes perceive the opportunities and threats associated with green infrastructure.

12.3.1.2 Develop Social Capital through Green Infrastructure Planning

Planners and leaders of green infrastructure planning processes can also support the development of social capital in green infrastructure planning by supporting the development of relationships and trust among residents and stakeholders in green infrastructure planning processes, and through developing networks of diverse groups of stakeholders.

The research demonstrated the potential for green infrastructure planning processes to support the development of relationships and trust through in-depth, flexible community engagement processes, opportunities for community leadership, and prioritization of concerns discussed by residents in planning processes, including engaging concerns that fall outside of green infrastructure project design. Planners can support the development of strong, diverse networks by supporting partnerships with outside groups to address concerns outside of project design, such as jobs and workforce development.

Notably, processes with these qualities were more likely to incorporate equitable development concerns into projects and their planning processes. However, the building of relationships and trust, networks of communication, and intellectual capital were also important outcomes in themselves, leading to increased community voice and empowerment, which support opportunities for shaping future outcomes as well. The potential for communities to empower themselves around the opportunities and threats posed by green infrastructure is an important outcome in itself. Planners and leaders of green infrastructure planning processes should support these components of green infrastructure planning in order to support residents in shaping projects to meet community

needs and increase incorporation of equitable development concerns, as well as to support community empowerment more broadly through opportunities for engagement, leadership, and knowledge sharing.

12.3.1.3 Incorporate Equitable Development Concerns into Green Infrastructure Projects and Planning Efforts

The findings surrounding the ability of social capital to shape green infrastructure projects and planning processes suggest a couple of recommendations for planning and policy. First, with regard to the expansion of green infrastructure planning processes to address equitable development concerns, they demonstrate the important role of planners in supporting community engagement and knowledge sharing, connections to outside groups and funders, and flexibility and commitment with regard to meeting goals discussed by residents in planning processes.

Yet, even in cases when high standards for community engagement and incorporation of residents' concerns were met, the findings emphasize that project-level social capital faces several limitations with regard to the incorporation of equitable development concerns into green infrastructure projects, including the narrow focus and capacity of the environmental organizations and agencies frequently in charge of green infrastructure planning processes, the incorporation of equitable development concerns into projects in limited ways, the potentially slow speed of implementation of programs in the face of quickly-changing market dynamics, and a lack of prioritization of goals included in plan documents. These limitations suggest an important role for city-level

policy, in addition to project-level social capital, to support the achievement of equitable development goals surrounding green infrastructure projects.

These findings suggest the need for a more comprehensive approach to incorporating equitable development concerns into green infrastructure planning and implementation. Specifically, planners and leaders of green infrastructure planning processes might work with residents to develop standards for the incorporation of equitable development concerns into green infrastructure planning efforts so that neighborhood residents do not bear the burden of bringing these concerns into each individual project planning process. Standards for community engagement and project implementation that support residents in shaping project design and incorporating concerns such as workforce development, housing affordability, and community benefits into projects would support consistency in this area. For example, a standardized process in which a citywide green infrastructure workforce development program connects with individual green infrastructure planning efforts to ensure that local residents are trained and hired for the construction and maintenance of projects, combined with local/ neighborhood hiring requirements for projects receiving city funding, would support and require the inclusion of equitable development concerns into green infrastructure projects at a larger scale than the individual project.

12.3.2 Recommendations for Neighborhood Residents and Community Groups

12.3.2.1 Advocate for In-Depth Community Engagement in Green Infrastructure Planning Efforts

For neighborhood residents and community groups, one recommendation is to support in-depth community engagement in green infrastructure planning processes. This could include developing standards for community engagement in green infrastructure planning processes to increase consistency with regard to how projects engage with residents and stakeholders. By advocating for specific requirements and building a vision for community engagement around green infrastructure projects, residents and community groups can increase their ability to have leadership roles and shape green infrastructure projects going forward. Community engagement standards could also address how projects engage residents around issues of gentrification, displacement, and community benefits.

12.3.2.2 Advocate for Equitable Development through Green Infrastructure

Another role for neighborhood residents and community groups and is to use green infrastructure as a mechanism to advocate for equitable development. Residents and community groups can use research around the impacts of green infrastructure regarding gentrification and displacement to advocate for the development of citywide policies and strategies to address these concerns. As occurred in the case neighborhoods, individual green infrastructure projects might serve as a testing ground for policies and strategies, such as workforce development programs, inclusionary zoning, or community land trusts, which residents and community groups can then advocate for expanding citywide. The opportunities and threats posed by green infrastructure make these projects unique targets for advocacy efforts and the development of policies and strategies focused on addressing housing affordability and community benefits concerns.

12.3.3 Recommendations for Policymakers

12.3.3.1 Build Supportive Political Contexts

Finally, policymakers can engage with residents, community organizations, and other stakeholders to develop strong city-level policies and regulations surrounding housing affordability and community benefits concerns. As the research's findings show, policies and strategies can address the limitations of social capital at the project level, further support social capital by supporting the work of neighborhood groups, and provide a basis for challenging projects that don't meet equitable development goals. Of the case cities examined in this study, Washington, D.C.'s more supportive political context included strong institutions around housing affordability and community benefits concerns, including a wealth of organizations dedicated to affordable housing development; consistent funding for the development of affordable housing, which further supported the work of neighborhood-level actors in developing strategies to address housing affordability concerns; stricter policies in support of housing affordability, including a citywide inclusionary zoning ordinance; and requirements surrounding workforce development and local hiring on green infrastructure projects led by the city's water and sewer authority, D.C. Water. In combination with policies and strategies such as these, regulations such as zoning can be used to support more equitable outcomes surrounding housing affordability, as they can allow for more dense development to increase housing supply or make the production of affordable housing more feasible by reducing costs such as parking requirements.

12.4 Recommendations for Future Research

The study indicates several important avenues for future research. First, it highlights the need to examine green infrastructure projects and other development that have achieved positive outcomes with regard to supporting equitable development goals outside of project design, such as housing affordability and workforce development. Case studies focused on examining the positive outcomes and limitations in achieving equitable development goals for these projects could provide a more extensive perspective of best practices and continuing challenges.

Further, conversational analysis of green infrastructure planning processes could provide additional insight into the roles of facilitators and other actors in these processes, providing the ability to compare processes which resulted in more equitable outcomes with those that did not, and the role of planners, project leaders, and community actors in contributing to these outcomes.

Finally, the study highlights the need for additional research around the role of political context in supporting or inhibiting the development of social capital around issues of housing affordability and community benefits and in contributing to more equitable outcomes in green infrastructure planning and implementation. Examination of additional cities with regard to the role of political context would provide a more comprehensive understanding of the institutions, policies, and funding mechanisms that have been used to alleviate environmental gentrification concerns and promote community wellbeing and empowerment.

APPENDIX A. SAMPLE INTERVIEW PROTOCOL

General/ History/ Community

- City/ neighborhood context of green infrastructure planning
- Reasons for getting involved in green infrastructure planning
  - History of organizing
  - What are the other big issues in the neighborhood and what they were a few years ago?
- Timeline of events surrounding green infrastructure project planning
- What are your organization's goals surrounding green infrastructure investment?
- How have those goals evolved over time?
- Can you talk a little bit about the community in general?
- Why is green infrastructure investment occurring in this particular area?
- What are the impacts on community of the investment?
  - Are there concerns in community about the impacts of new projects?
  - Has green infrastructure catalyzed activism, and how?
- What are the main challenges to social equity in the neighborhood?
  - How is the community responding?

Political Context

- Which local policies shape the potential for groups to address concerns surrounding housing affordability, gentrification and displacement, and community benefits, and how?
- Which state policies shape the potential for groups to address concerns surrounding housing affordability, gentrification and displacement, and community benefits, and how?
- Institutions and procedures that shape groups' ability to address concerns surrounding housing affordability, gentrification and displacement, and community benefits

Networks/ Actors

- Major actors and institutions in relation to green infrastructure/ equitable development concerns
- How have external actors to neighborhood shaped projects/ outcomes
- Describe your/ your organization's working relationships with:
  - Government agencies
  - Community based organizations/ nonprofit organizations/ grassroots groups
  - Private/ business actors
  - International/ national organizations
- Who are the main actors around equity concerns in particular, and why?
- What are the benefits from each of these types of relationships?

    - Why are you trying to develop these relationships, what getting from each set
    - What relationships are most important to spend time on
    - How have relationships worked/ not worked?
    - Have relationships met expectations?
- How connected were groups before and after project? How have connections evolved?

Outcomes

- How have relationships/ collaboration influenced projects?
    - What are the challenges/ barriers to influencing projects to meet community goals?
- How has collaboration shaped policies/ outcomes surrounding affordability/ community benefits?
    - What are the challenges/ barriers to institutionalizing policies surrounding these issues?
- What specifically comes out of collaborative meetings? What happens that is useful?
- What are the reasons for any lack of policy/ program development?
- Recommendations for communities focused on equitable green infrastructure planning?

APPENDIX B. CASE NEIGHBORHOOD GREEN INFRASTRUCTURE PROJECTS

Atlanta Green Infrastructure Projects

The Atlanta Beltline Westside Trail

The Atlanta Beltline Westside Trail is a 3-mile segment of the larger planned 22-mile Atlanta Beltline system of trails, parks, and transit. The Westside trail segment links Adair Park in the Adair Park neighborhood to Lena Avenue and Washington Park in the Washington Park neighborhood. The $43 million project broke ground in November 2014 and opened to the public in September 2017, as the first segment of the Beltline completed since the Beltline Eastside Trail opened in 2012 (Green, 2017).

The larger Beltline project's master planning efforts have focused on land use and urban and environmental design, as well as economic development opportunities surrounding the multi-use trail. The project's major program elements include parks, trails, transit, affordable housing, streetscape improvements, and economic redevelopment (Atlanta Beltline, Inc., 2013). The Subarea 10 Master Plan, which covers the Westside trail segment, includes strategies surrounding land use and design, mobility, parks and open space, economic development, and arts and culture (MACTEC Engineering and Consulting, Inc. with Perkins + Will and Grice and Associates, 2010).

Planning for the Atlanta Beltline is led by Atlanta Beltline, Inc. (ABI), a government entity formed by Invest Atlanta in 2006 to manage the Beltline's implementation. The Atlanta Beltline Partnership (ABP), a non-profit organization formed

in 2005, raises funds for the project and supports its programming, advocacy, and outreach. The City of Atlanta will ultimately own the project, and its departments have been active in its planning and implementation. In implementing the Beltline, ABI and ABP have partnered with a variety of other actors, including local government actors such as Invest Atlanta, the city's development authority, and the Metropolitan Atlanta Rapid Transit Authority (MARTA); regional and state actors, such as the Atlanta Regional Commission and the Georgia Department of Transportation; national government agencies, such as the U.S. Environmental Protection Agency and the U.S. Department of Transportation; national non-profit organizations, such as the Conservation Fund and the Trust for Public Land; and local community and non-profit organizations, such as the PATH Foundation, TREES Atlanta, and Park Pride (Atlanta Beltline, Inc., 2018).

Cook Park

Cook Park is a planned 16-acre park located in the Vine City neighborhood on its border with English Avenue, along Joseph E. Boone Boulevard, that will include The park is part of the Department of Watershed Management's Upper Proctor Creek Watershed Action Plan for $50 million in investments in four park and stormwater management projects, including the Cook Park pond, Westside Reservoir Park pond, Proctor Park, and the Boone Boulevard green streets. The City of Atlanta signed a Memorandum of Agreement with the Trust for Public Land to construct the park in December 2015 (Cook Park, n.d.), and began construction on the $45 million project in May 2017. Cook Park is expected to be open to the public in 2019 (Trust for Public Land, n.d.). The park has been discussed as a "mirror project" to the city's Old Fourth Ward Park, a park connected to the

Atlanta Beltline's Eastside Trail that has been associated with redevelopment on the eastern side of the city (Trubey, 2017, HDR, Inc).

Figure 32: Cook Park rendering (HDR, Inc., n.d.)

The city and its partners have emphasized the park's environmental, social and cultural, and economic benefits. One of the major purposes of the park is to address historic flooding concerns in the city's Westside neighborhoods. The park was constructed on a site that was once a residential area that had experienced repeated flooding (Cook Park, n.d.). Following a flood event in 2002, residents of the area were relocated, and the site was considered for the potential construction of a stormwater management park. A large stormwater management feature to be included in the park is designed to hold up to 10 million gallons of stormwater, serving as drainage for 320 acres in surrounding neighborhoods (City of Atlanta Department of Watershed Management, 2016, HDR, Inc., n.d.). Additional stormwater management features will include rain gardens, streetscape

stormwater planters, and constructed wetlands and native plantings surrounding the stormwater pond (HDR, Inc., n.d.). The city's Department of Watershed Management has also emphasized that the park's pond will increase the capacity of the combined sewer system and eliminate sewer spills (City of Atlanta Department of Watershed Management, 2016).

The City has also emphasized the park's economic impact for Atlanta's Westside neighborhoods. A 2016 press release from Mayor Kasim Reed's office noted that the park "will serve as a catalyst for economic development on the Westside" (City of Atlanta, 2016). Cook Park's connections to other parks and greenways in the area are also expected to drive economic development. The Upper Proctor Creek Watershed Action Plan describes the park as a component in "partnerships with planned parks and greenways to improve property values and promote development and redevelopment" (City of Atlanta Department of Watershed Management, 2016).

City agencies have also proposed social benefits of the project (City of Atlanta Department of Watershed Management, 2016). Social, recreational, and educational amenities include a playground and splash pad, outdoor learning center, fitness center, sports courts, and walking trails, among others. The park is also designed to provide cultural amenities and honor the neighborhood's history. The name Cook Park honors Rodney Cook Sr., who worked closely with Atlanta Civil Rights leaders (Green, 2017). The park will include 16 statues honoring local Civil Rights leaders and peacemakers (see Figure 33). Additional cultural amenities include an amphitheater and performance plaza.

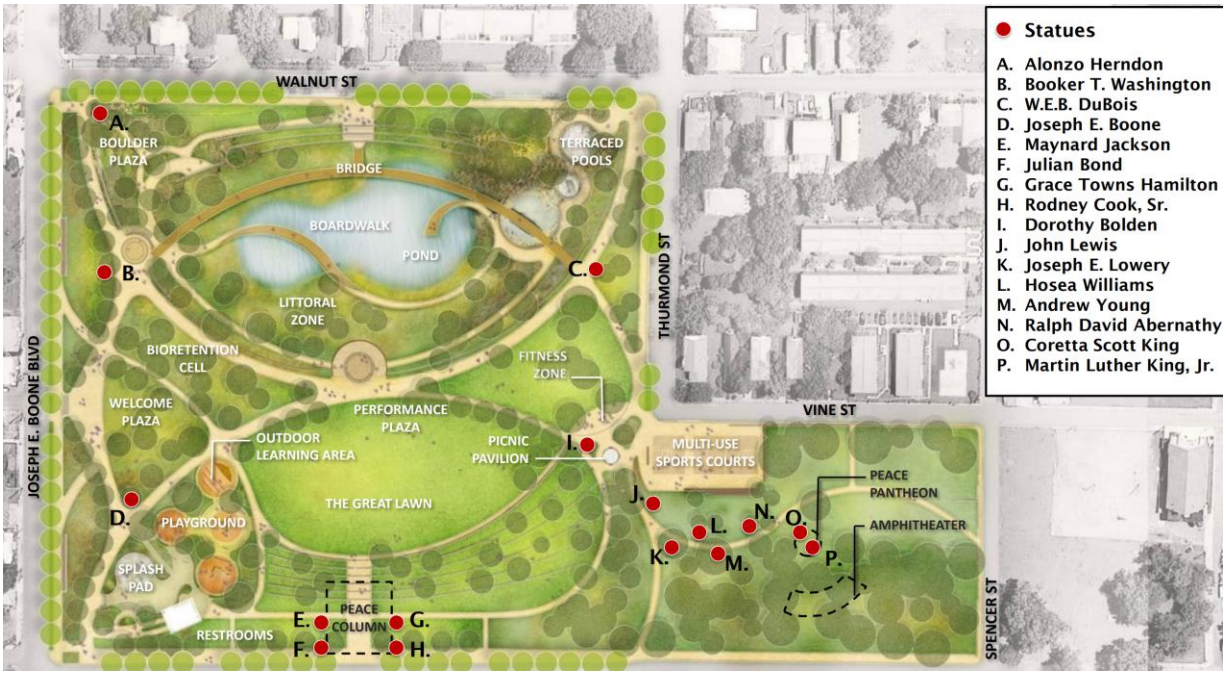


Figure 33: Locations of park amenities environmental, recreational, and cultural amenities, including statues honoring Civil Rights leaders and peacemakers

The park is being constructed through a collaboration between the Trust for Public Land, which will design, construct, and raise funds for the park; the City of Atlanta's Department of Watershed Management, which will manage costs associated with design, construction, and maintenance of the park's stormwater facility, and remediate contaminated soils in portion of the park; the city's Department of Parks and Recreation, which will manage and maintain the site; and the Atlanta-based National Monuments Foundation, which will design, maintain, and fundraise for the park's statues of Georgia peacemakers and Civil Rights leaders. Funding for the park's design was supported by the Arthur M. Blank Family Foundation (Cook Park, n.d.), and the park design was led by the firm HDR, Inc.

Lindsey Street Park, Vine City Park, and Kathryn Johnston Memorial Park

Lindsey Street Park, Vine City Park, and Boone Park West are smaller parks planned as part of the Proctor Creek North Avenue Green Infrastructure Vision plan (PNA plan) completed by Park Pride in 2010 (Park Pride, 2010). The PNA project aims "to remedy past unsustainable practices; to introduce new parks and greenspace; to provide cleaner surface and ground water; to reduce flooding; to improve quality of life; and to promote other related positive environmental and economic impacts" (Park Pride, 2010, p. 8). The parks' acquisition, planning, and construction has been funded in part through a partnership between the Arthur M. Blank Family Foundation and The Conservation Fund. The Blank Foundation hired The Conservation Fund to perform an initial assessment of the city's green infrastructure, and later provided a grant for the fund to establish a revolving fund for acquisition of green space (The Conservation Fund, n.d.).

Lindsey Street Park was the first project constructed as part of Park Pride's Proctor Creek North Avenue Green Infrastructure Vision plan. The park is a 1.5-acre park in the English Avenue neighborhood, built for approximately $750,000 in 2015. It includes a lawn, playground, children's garden, riparian restoration along an existing stream, a constructed stream, paths, and overlooks. The Conservation Fund, a national environmental non-profit organization, worked to acquire six abandoned lots that would become the park as part of its Parks with Purpose program (Lee, 2015). The Conservation Fund describes the benefits of the park as including environmental benefits such as absorption and cleaning of stormwater runoff in rain gardens and the addition of native trees, shrubs, and flowers to support local wildlife and pollinators; and economic and social benefits including the transformation of vacant and blighted lots to provide a safe play and gathering place for children and community members; the training and employment of four

young adults during the park's construction; another job training program in asbestos abatement and home deconstruction and demolition; and environmental education opportunities through a Watershed Academy program in partnership with grassroots organizations such as the West Atlanta Watershed Alliance (The Conservation Fund, n.d.). The park was funded by the a public, private and non-profit groups including the Arthur M. Blank Family Foundation, Invest Atlanta, Park Pride, The Conservation Fund, U-Haul, and the Waterfall Foundation.

The expansion of Vine City Park constitutes another portion of the PNA green infrastructure plan and The Conservation Fund's Parks with Purpose program (The Conservation Fund, n.d.). The first phase of Vine City Park was constructed in 2007, with $1.9 million in funding from the Arthur M. Blank Family Foundation, the Westside Tax Allocation District, and the Department of Watershed Management (Park Pride, 2013). In 2012, an adjacent vacant, boarded up apartment building was acquired for the park's second phase, which was completed in 2016. The expansion includes an expanded playground, exercise equipment, a rain garden, a dry creek bed, a micro-forest, and educational signage (Khan, 2016).

The $3.2 million Kathryn Johnston Memorial Park, which will transform 4.5 acres of blighted lots at the intersection of Joseph E. Boone and Joseph E. Lowery boulevards, is set to open in 2019 as the third park built through The Conservation Fund's Parks with Purpose program. It includes rain gardens designed to capture and clean 299,000 gallons of stormwater; permeable pavement; an open lawn; playgrounds and exercise equipment; shaded structures, grills, and picnic tables; and walking trails (The Conservation Fund, Park Pride, Community Improvement Association Environmental Resource Center,

Chattachoochee Riverkeeper, & English Avenue Neighborhood Association, 2016). An Atlanta Urban Ecology Resource Center, which would serve as an environmental education center focused on K-12 education, jobs training, and other environmental education activities, is proposed adjacent to the park. Community Improvement Association has received a $100,000 grant for a feasibility study to develop the center (Invest Atlanta, 2017). Kathryn Johnston Memorial Park is a collaborative effort between Park Pride, the Department of Parks and Recreation, the Mayor's Office of Sustainability, and several other organizations.

Figure 34: Kathryn Johnston Memorial Park and proposed site of Atlanta Urban Ecology Resource Center (The Conservation Fund, Park Pride, Community Improvement Association Environmental Resource Center, Chattahoochee Riverkeeper, & English Avenue Neighborhood Association, 2016)

Joseph E. Boone Boulevard Green Streets

The Boone Blvd. green street was also implemented as part of the PNA vision. In 2012, the City of Atlanta was selected as one of seventeen communities to receive funding and technical assistance through the Environmental Protection Agency's (EPA's)

Community Partners Program. The program assists communities in designing and implementing green infrastructure in distressed neighborhoods to reduce flooding and combined sewer overflows (CSOs) (Office of Research and Development and Region 4 U.S. Environmental Protection Agency, 2015). Tetra Tech, a contractor to the EPA, worked with Park Pride to conduct field assessments and stakeholder meetings to rank proposed sites (U.S. EPA, 2014). As the Department of Watershed Management was unable to secure funding to implement the entire PNA vision, the Boone Boulevard green street project was selected as a starting point to build further support for the remainder of the plan (Office of Research and Development and Region 4 U.S. Environmental Protection Agency, 2015).

Along with Cook Park pond, Westside Reservoir Park pond, and Proctor Park, the Boone Boulevard green streets are part of the Department of Watershed Management's Upper Proctor Creek Action Plan, which aims to provide environmental, economic, and social benefits to the watershed and its residents. The project consists of a redesign of the street, including a reduction from four lanes to two lanes; the addition of a bike lane on each side of the street, a row of in-ground planter boxes, and rain gardens and grass spillways at the entrance of Cook Park to capture and treat stormwater runoff coming from the street before it enters the sewer system (see Figure 35). The project's stormwater management components are designed to store 200,000 gallons of stormwater from a drainage area of 6 acres (City of Atlanta Department of Watershed Management, 2016). Additional expected environmental benefits of the project include demonstrating alternative solutions to stormwater issues; reducing the burden on existing stormwater

infrastructure; reducing CSO events; and reducing water pooling in streets (Office of Research and Development and Region 4 U.S. Environmental Protection Agency, 2015).

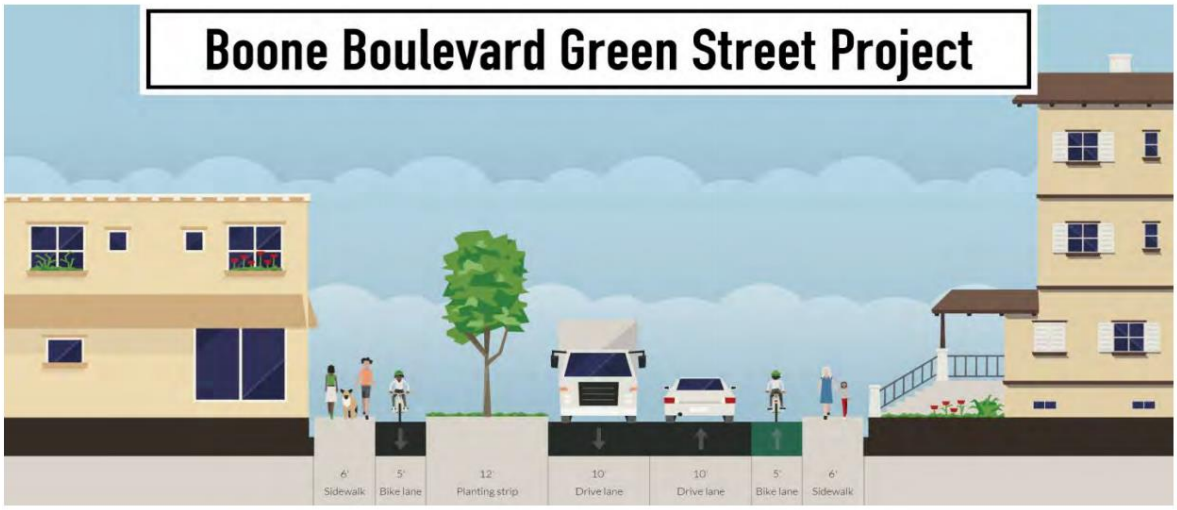


Figure 35: Planned Boone Boulevard green street (Office of Research and Development and Region 4 U.S. Environmental Protection Agency, 2015)

The project is funded by the Department of Watershed Management, RENEW Atlanta infrastructure bond program, Invest Atlanta, the PATH Foundation, the Georgia Environmental Protection Division, and the Atlanta Regional Commission's Livable Centers Initiative (City of Atlanta Department of Watershed Management, person communication, February 23, 2018, RENEW Atlanta TSPLOST, n.d., U.S. Environmental Protection Agency, 2014).

Westside Reservoir Park at Bellwood Quarry

The Westside Reservoir Park at Bellwood Quarry is a planned 280-acre greenspace in the Grove Park neighborhood of Atlanta. According to the park's master plan, adopted by the Atlanta City Council in 2009, the park surrounding the quarry is planned to include

passive recreational spaces, including meadows, an amphitheater, a dog park, and gardens; active recreational uses, such as sports fields and a skate park; a trail network; and public art. The park will connect to the Atlanta Beltline and the Proctor Creek Greenway. Phase 1 of the $26.5 million park project will include a gateway entrance with lighting and signage, roadway resurfacing, greenery enhancement, trails, and a connection to the Proctor Creek Greenway, and is expected to open to the public in 2019 (City of Atlanta, 2017). The park's pond is part of the Department of Watershed Management's Upper Proctor Creek Action Plan, which aims to provide environmental, economic, and social benefits to the watershed and its residents.

The quarry is planned to serve as a backup water supply for the city in case of drought or contamination of its regular water supply, and will hold up to 2.4 billion gallons, a 30-day supply of water (City of Atlanta Department of Watershed Management, n.d., Leslie, 2016). The conversion of the quarry requires the drilling of a five-mile tunnel to connect the reservoir with the Hemphill water treatment plants and the Chattahoochee River Intake (City of Atlanta Department of Watershed Management, n.d., Kelley, 2016). The $300 million Water Supply Program, including the tunnel and reservoir, is funded by the city's Municipal Option Sales Tax, which was reauthorized by Atlanta voters in March 2016 (City of Atlanta Department of Watershed Management, n.d.).

Figure 36: Rendering of the planned Westside Reservoir Park at Bellwood Quarry (HGOR, n.d.)

The Westside Reservoir Park was planned through a partnership between Atlanta Beltline, Inc., the City of Atlanta, and the City of Atlanta Department of Watershed Management. The planning process has included steering committee and study group meetings, primarily focused on park design and programming (Pond & Company, & Carol R. Johnson Associates, 2009). The City broke ground on the park in 2018.

Proctor Creek Greenway

The Proctor Creek Greenway is a seven-mile bike and pedestrian trail that will run from Maddox Park to the Chattahoochee River along Proctor Creek. The city has highlighted the trail for the connections it creates between parks and transit, as well as its environmental, social, and recreational benefits (City of Atlanta, 2017, RENEW Atlanta

TSPLOST, n.d.). The full trail will include 50 acres of linear park and 400 acres of greenspace, and will connect the Atlanta BeltLine Westside Trail, the Bankhead MARTA Station, and Westside Reservoir Park (City of Atlanta, 2017) as well as multiple schools (Emerald Corridor Foundation, n.d). The trail construction will also include stabilization of the creek streambank, planting of native plants, removal of impervious surfaces, and reduction of stormwater runoff into the creek (RENEW Atlanta TSPLOST, n.d.). Proposed recreational and social benefits include the provision of "a spectacular ribbon of greenspace and a world class trail to an underserved community" (RENEW Atlanta TSPLOST, n.d.). Construction of the entire trail is expected to cost $11.5 million.

Figure 37: Rendering of an elevated trail proposed for Phase 1 of the Proctor Creek Greenway's construction (Kaizen Collaborative, n.d.)

The Department of Watershed Management provided $160,000 in 2016 for the PATH Foundation to design and engineer the project's first phase (PATH Foundation, 2017). The $4-million, 2-mile first phase of the trail broke ground in August 2017 and is expected to be completed in early 2018. This portion of the trail will run from the Bankhead MARTA Station through the future Westside Reservoir Park to the River Park Trail. This phase was funded by $3 million from the City of Atlanta, raised through revenues from a referendum approved by voters in fall 2016 to raise sales taxes by 4/10 of a cent (special purpose local option sales tax for transportation, or TSPLOST), plus dollars from the Mayor's Office of Resilience, the Department of Watershed Management, Atlanta Beltline, Inc., and the PATH Foundation (Miller, 2017).

Figure 38: Proctor Creek Greenway phase 1 trail segment, to be completed in 2018 (Kaizen Collaborative, n.d.)

Proctor Park

Proctor Park is a planned 9.2-acre greenspace with a 4-acre constructed wetland. Like the Cook Park pond, the Westside Reservoir Park pond, and the Boone Boulevard green streets project, the park is part of the Department of Watershed Management's Upper Proctor Creek Action Plan, which aims to provide environmental, economic, and social benefits to the watershed and its residents. The park is planned to include a greenway trail; a pedestrian bridge over Proctor Creek; a playground; a fitness station; four acres of

wetlands and natural systems; a boardwalk and deck; an education center; and interpretive signage (Emerald Corridor Foundation, n.d.).

Proctor Park's primary purposes include improving stormwater management and water quality, connecting neighborhoods with access to transit and recreation, and providing environmental education opportunities. The park is part of the Department of Watershed Management's Upper Proctor Creek Watershed Action Plan, which aims to improve the ecological health of the Proctor Creek Watershed and to provide a variety of environmental, economic, and social benefits (City of Atlanta Department of Watershed Management, 2016). It is planned to hold 5 million gallons of stormwater and drain an area of 3,100 acres (City of Atlanta Department of Watershed Management, 2016). Proctor Park has also been emphasized for its potential to connect the surrounding communities to transit via the adjacent Bankhead MARTA station (Emerald Corridor Foundation, n.d.). It will also include connections to the Atlanta Beltline, which is planned to be constructed adjacent to existing Maddox Park, and the Proctor Creek Greenway.

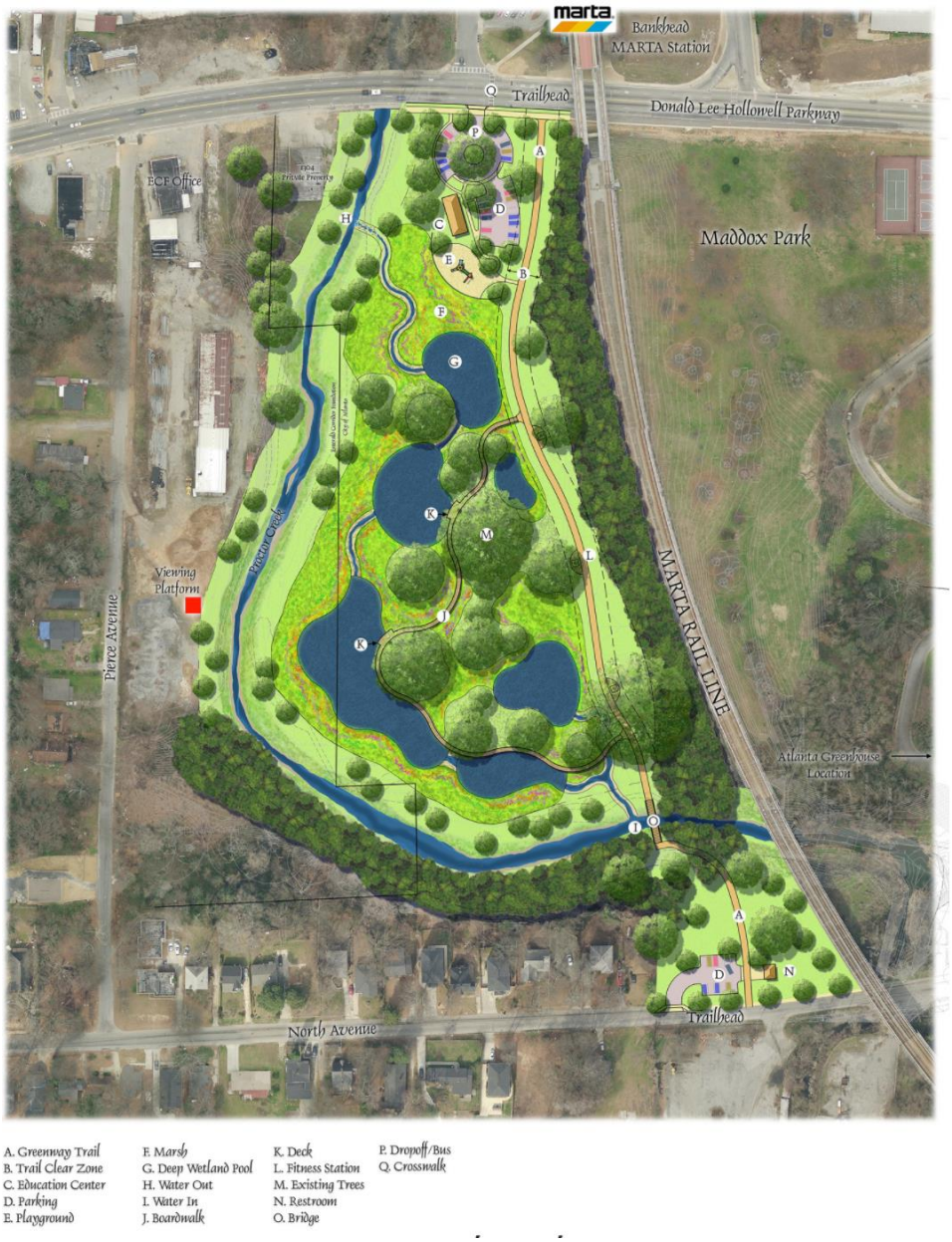


Figure 39: Proctor Park location and features

Proctor Park and the Proctor Creek Greenway are part of a larger plan for a "Gateway" area at the intersection of multiple parks and transit components, which also includes the Bankhead MARTA Station; Maddox Park; the Atlanta Beltline transit and trail; the future Westside Reservoir Park; and the future Atlanta Streetcar (Emerald Corridor Foundation, n.d.). As the Emerald Corridor Foundation's description of the

Gateway describes, these amenities "will catalyze this cluster of long-abandoned buildings and create a focused area of commerce and activity. New park, trails and improved connectivity will reactivate this area around the Bankhead MARTA Station" (Emerald Corridor Foundation, n.d.). The plan for the area has also been developed through the Atlanta Beltline's master planning process and approved by the City Council (Emerald Corridor Foundation, n.d.).

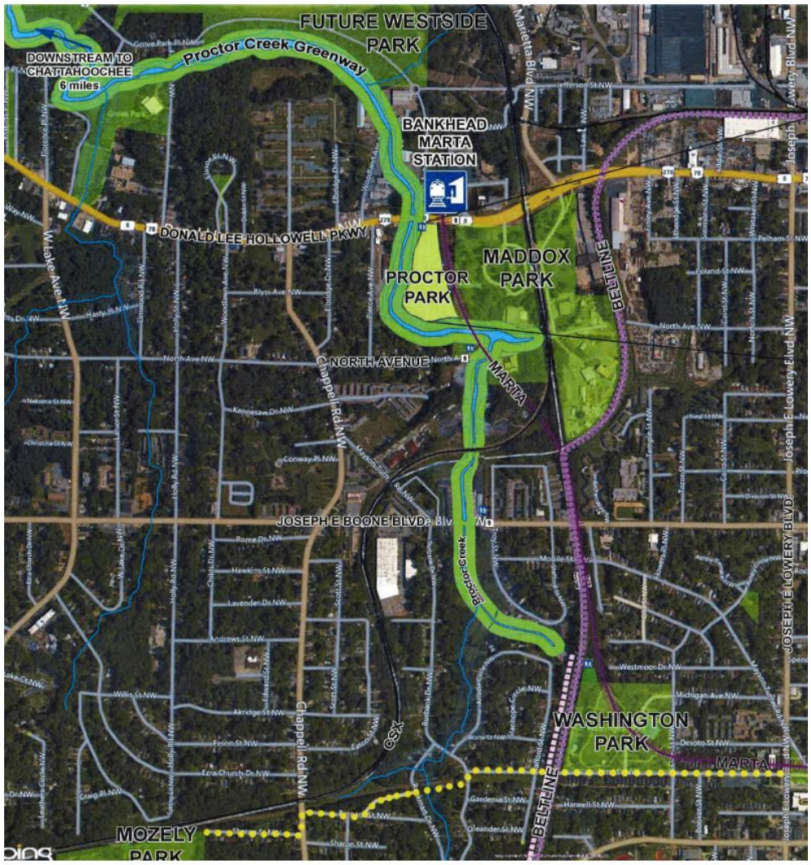


Figure 40: Location of Proctor Park and Proctor Creek Greenway in relation to Bankhead MARTA Station and the planned Westside Reservoir Park

The park was funded by a $280,000 grant from the Land and Water Conservation Fund from the National Parks Service, as well as contributions from the City of Atlanta and the Emerald Corridor Foundation.

Proctor Creek Watershed Cleanup

Proctor Creek has been a polluted waterway for several decades. Initially, the main problem was limited sewer capacity, with millions of gallons of sewage flowing into the waterway during rain events. The Chattahoochee Riverkeeper sued the City of Atlanta over violations of the clean water act in 1995, and investments in infrastructure and sewer capacity since then have improved water quality in the creek. However, runoff from paved surfaces in the watershed continues to pollute the creek (Samuel, 2017). A combination of federal and local efforts, including several of the parks described in this section, are aiming to improve water quality in the Proctor Creek Watershed.

In 2013, the Proctor Creek Watershed was announced as a designated location of the Urban Waters Federal Partnership, which aims to connect urban communities with their waterways and support them in becoming stewards for clean urban waters (U.S. Environmental Protection Agency, n.d.). In addition to environmental benefits of cleaning up the creek, the City has also emphasized the potential for catalyzing economic development. As Mayor Kasim Reed noted in a 2013 news release about the partnership,

> "The revitalization of Proctor Creek will transform neighborhoods throughout northwest Atlanta…With the help of federal and community partners, this effort will spur economic development, connect communities with new recreation opportunities and green space, and integrate critical investments in storm and wastewater management. This public-private partnership demonstrates Atlanta's commitment to becoming a top-tier sustainable city."

In November 2015, Mayor Kasim Reed, the Department of Watershed Management, and the U.S. Army Corps of Engineers entered into a three-year feasibility study of the Proctor Creek watershed to identify and evaluate solutions for cleaning and restoring the

creek. The City of Atlanta committed $300,000 to initiate the study (U.S. Environmental Protection Agency, n.d.).

The Proctor Creek Trash Free Waters Community Workforce Program, launched in 2016, is another effort to clean up the watershed, in which the Atlanta Workforce Development Agency hired workers from the Vine City and English Avenue neighborhoods to help clean up trash around Proctor Creek. The project is a partnership between EPA's Trash Free Waters Program, the Mayor's Office of Sustainability, the Community Improvement Association, the Proctor Creek Stewardship Council, Georgia Stand-UP, Trade-UP/Build-Up Program, Atlanta Workforce Development Agency, and the Keep Atlanta Beautiful Commission (U.S. Environmental Protection Agency, 2016, Ibata, 2016).

Washington, D.C. Green Infrastructure Projects

Anacostia Riverfront Trail and Waterfront Planning

The Anacostia Riverwalk trail is a planned 28-mile shared-use trail that runs along both sides of the Anacostia River and links to Maryland's trail system. The trail includes stormwater management features such as rain gardens and bioswales; viewing areas that bring users close to the river; and signage providing information about watershed restoration efforts and nearby cultural opportunities (Government of the District of Columbia, 2010). The completed trail will connect 16 neighborhoods that lie along the Anacostia waterfront. 19.5 of the ultimate 28 miles have been completed (Anacostia Waterfront Initiative, n.d.). The trail system is estimated to cost $50 million.

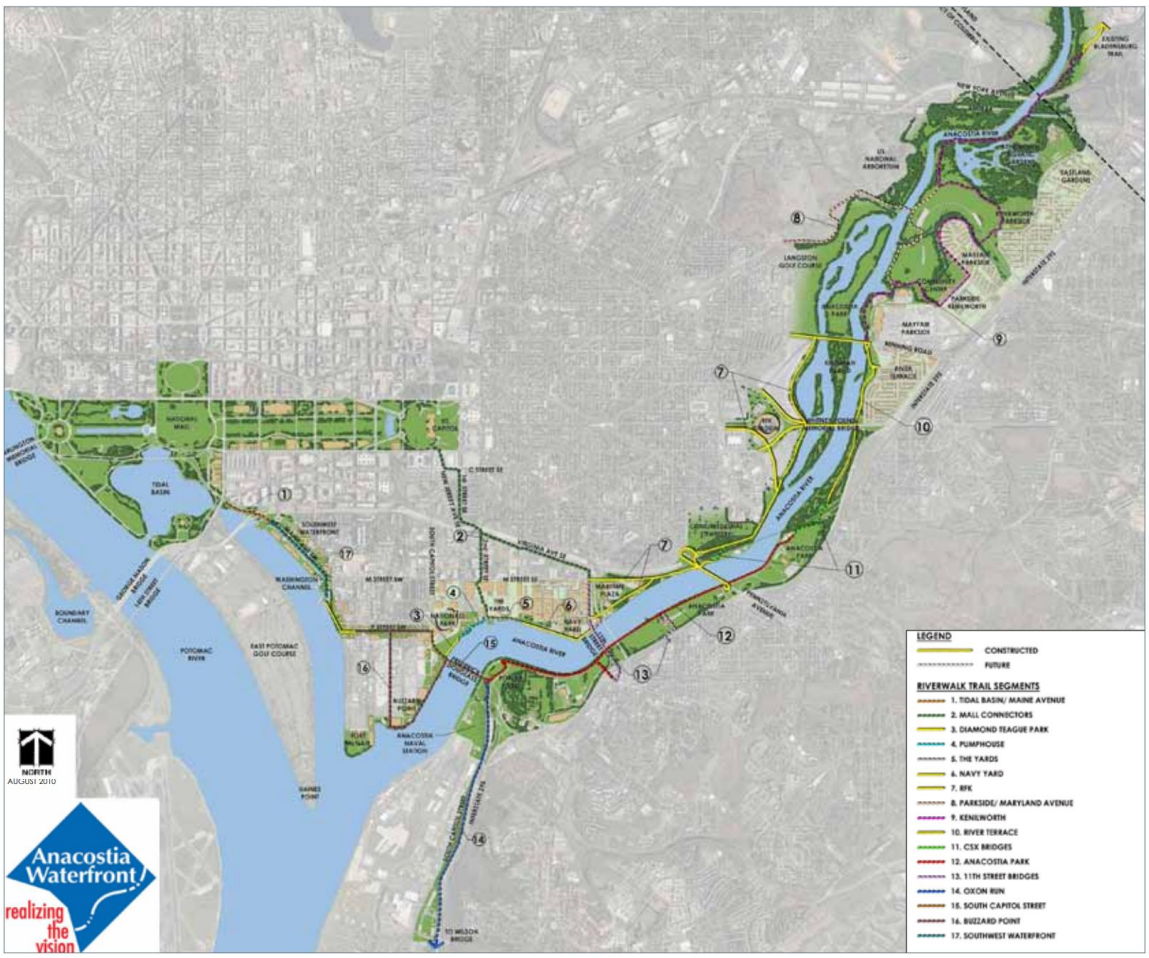


Figure 41: Anacostia Riverfront Trail segments (Government of the District of Columbia, 2010).

The project was developed as part of the Anacostia Waterfront Initiative, which was launched in 2000 through a memorandum of understanding between 20 federal and district agencies, with the goal of "transforming the Anacostia River from a forgotten and blighted river to s source of pride for the entire city and region" (Washington, D.C. Department of Transportation, 2014, p. 4). The group released the Anacostia Waterfront Initiative Framework Plan in 2003. The plan noted that growth in the district was expanding toward the eastern half of the city and argued that the Anacostia Waterfront Initiative had "the opportunity to coordinate this growth with infrastructure and public realm

improvements to create a vibrant, mixed-use waterfront" (District of Columbia, Office of Planning, 2003, p. 16). The plan notes the potential of the trail to connect diverse neighborhoods; create an interconnected waterfront park system; make the river publicly accessible; facilitate bicycle and pedestrian movement; increase transportation options and opportunities; provide opportunities for environmental education; incorporate local history and heritage; provide recreational opportunities; incorporate low-impact development standards; create new wetlands; and improve habitats (District of Columbia, Office of Planning, 2003).

11th Street Bridge Park

The 11th Street Bridge Park is a planned elevated recreation space on the piers of the old 11th Street Bridge. The park, slated to open in 2019, will connect higher-income, fast-growing areas of DC, such as Capitol Hill and the Navy Yard to the lower-income Anacostia area east of the river that have historically experienced disinvestment. The park is planned to include amenities such as outdoor performance spaces; playgrounds; urban agriculture; an environmental education center; public art; and kayak and canoe launches. The project's goals include improving health disparities and supporting healthy communities with recreation, connecting the Anacostia community to the river and to the Capitol Hill/ Navy Yard area, and serving as an anchor for inclusive economic activity (11th Street Bridge Park, n.d.).

The 11th Street Bridge Park is based in the nonprofit Building Bridges Across the River, a nonprofit community organization that has been based in the nearby Congress Heights neighborhood since 1997. To build the park, Building Bridges Across the River is partnering with the District Department of Transportation. The city is funding $14.5

million of the project's projected $40 million cost, which includes $25 million in construction costs and $15 million in operations funding), and Building Bridges Across the River is raising the remainder (O'Connell, 2014).

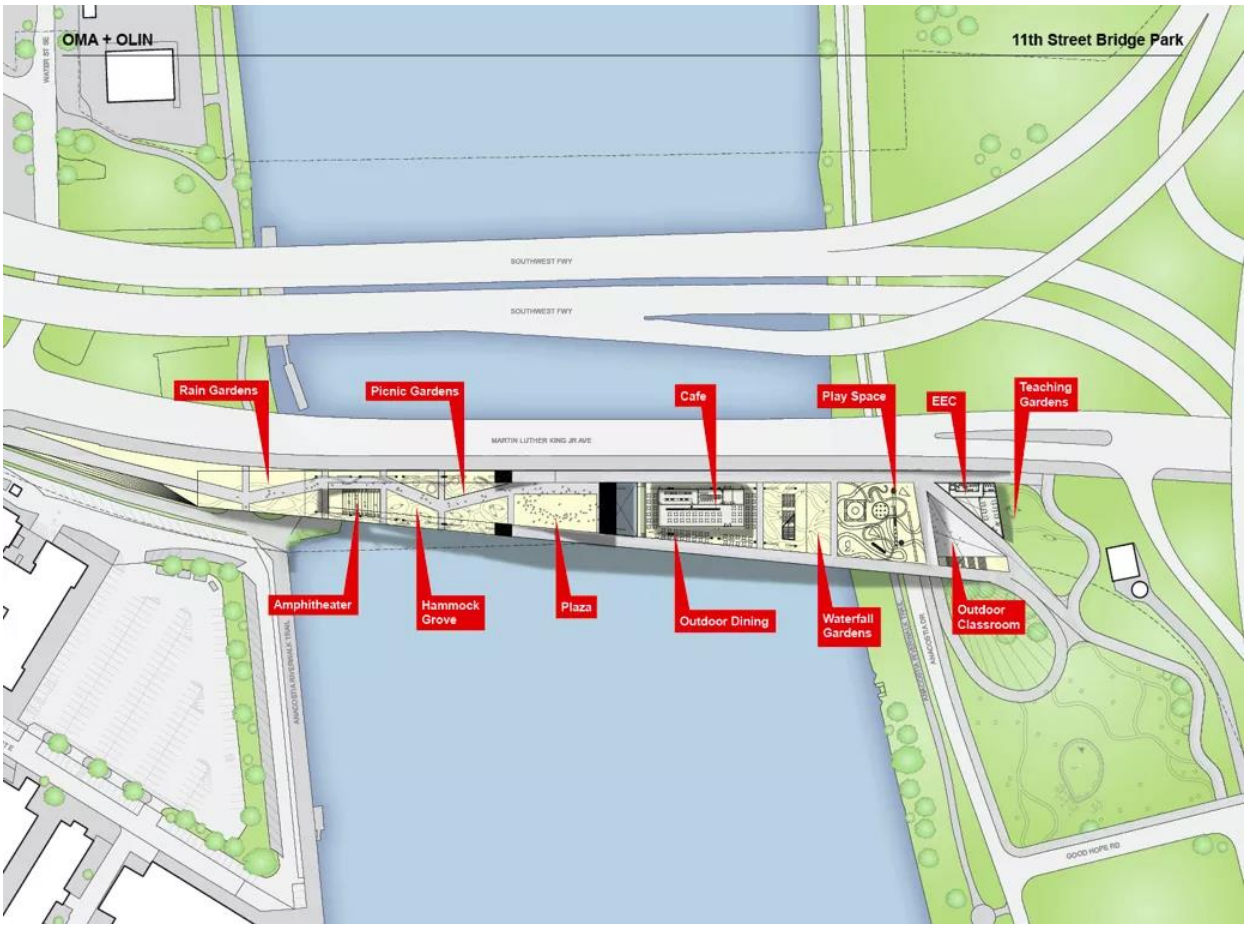


Figure 42: Plans for the 11th Street Bridge Park include features such as rain gardens, an amphitheater, a plaza, an outdoor classroom, and teaching gardens (OMA + OLIN)

Figure 43: Rendering of 11th Street Bridge Park's proposed amphitheater

After hearing concerns from residents regarding housing affordability, displacement, small business development, and the ability of residents to participate in the workforce opportunities created by the park's development, leaders saw the need to engage in planning efforts to ensure that the project fully served the interests of current residents. To provide a basis for policy and program recommendations, the park's leadership brought together an Equitable Development Task Force of experts from the Urban Institute; the Local Initiatives Support Corporation (LISC) in D.C., a community development financial institution; the D.C. Fiscal Policy Institute, a local think tank; and the D.C. Office of Planning to examine the park's impact area, which they defined as a 1-mile area

surrounding the bridge. Areas of analysis included aspects such as changes in property values over time and demographics in the park's impact area.

The group led the planning process for the park's Equitable Development Plan, which took place over about eight months from 2014 to 2015. The process included representatives of more than 50 nonprofit organizations, community groups, government agencies, and think tanks, in developing strategies for workforce development, small business development, and housing. The final plan included 19 recommendations in the three categories of housing affordability, workforce development, and small business development. Building Bridges Across the River and its partners are in the process of implementing the recommendations, including the formation of a community land trust.

Sustainable Congress Heights EcoDistrict (formerly St. Elizabeth's- Congress Heights EcoDistrict)

The Sustainable Congress Heights EcoDistrict is an inter-agency partnership developed with support from the Target Cities program led by EcoDistricts, a nonprofit organization that aims to support urban regeneration and community development through collaboration and social, economic, and ecological innovation (EcoDistricts, n.d.). The goal of the project is to implement existing plans and projects in a way that furthers neighborhood-scale sustainability, including improved environmental, economic and social outcomes (D.C. Office of Planning, n.d.). Washington, D.C. joined EcoDistricts' Target Cities program in 2014, and the agencies involved were brought together six times over a period of 18 months to work with EcoDistricts staff and experts to work toward goals for urban regeneration (EcoDistricts, 2017).

The EcoDistrict's leadership team is led by the Office of Planning, with other agencies involved including the Department of Energy and the Environment, the Department of General Services, the Office of the Deputy Mayor for Planning and Economic Development, the Department of Employment Services, the Department of Transportation, and the Department of Housing and Community Development. Beginning in 2011, the District partnered with the non-profit EcoDistricts in three EcoDistricts Target City projects, including the Downtown DC EcoDistrict, the SW EcoDistrict, and the St. Elizabeth's Congress Heights EcoDistrict. Strategies include the use of green infrastructure, the development of walkable urban neighborhoods, and tools to reduce energy consumption (Sheir, 2015).

Gateway Pavilion at St. Elizabeth's East

D.C's Office of the Deputy Mayor for Planning and Economic Development is completing several projects that include green infrastructure components. The department is leading planning efforts for the St. Elizabeth's East Campus, a large redevelopment project on the site of the former St. Elizabeth's Hospital. In addition to planned 1.8 million square feet of office, 1,300 residential units, 206,000 square feet of retail and at least two hotels, and a new sports facility for the Wizards and Mystics teams, the site also houses the Gateway Pavilion, an events space that includes a 1-acre park and a pavilion with a green roof (Office of the Deputy Mayor for Planning and Economic Development, 2018).

Poplar Point

D.C's Office of the Deputy Mayor for Planning and Economic Development is also leading planning for the city's redevelopment of Poplar Point, a waterfront property which includes 130 acres of greenspace. The property is still controlled by the National Park

Service; yet, portions of land surrounding the government-owned site have been proposed for large development projects, including the Redbrick LMD's Columbian Quarter mixed-use development. Poplar Point has been framed largely in terms of its redevelopment potential. The Washington Business Journal reported that the City considers the project one of its 10 largest development projects (Niebauer, 2017), and the District's Office of the Deputy Mayor for Planning and Economic Development describes it as "one of the last great urban waterfront redevelopment opportunities on the East Coast" (Office of the Deputy Mayor for Planning and Economic Development, n.d.).

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